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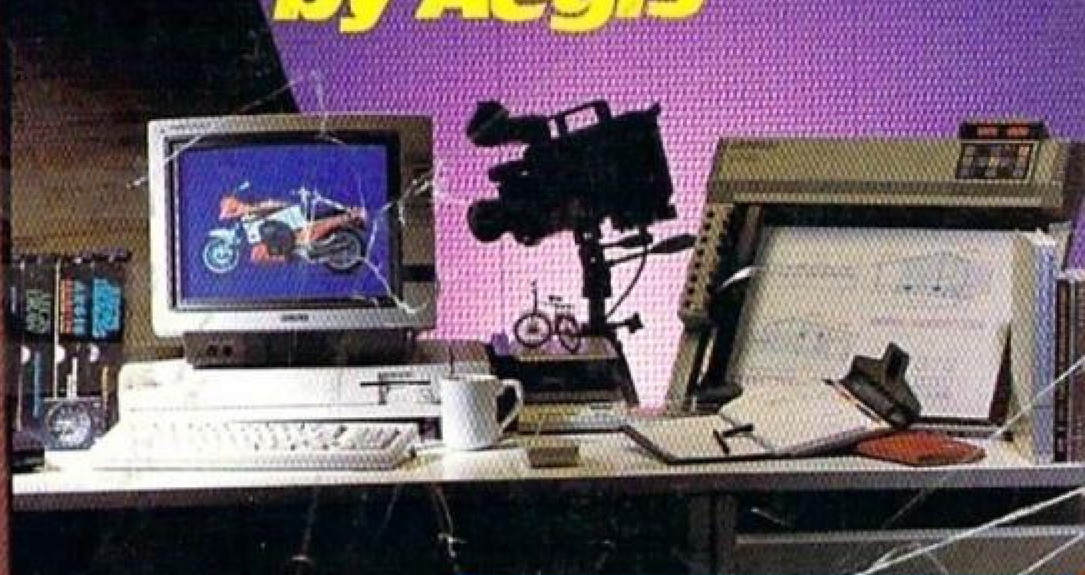

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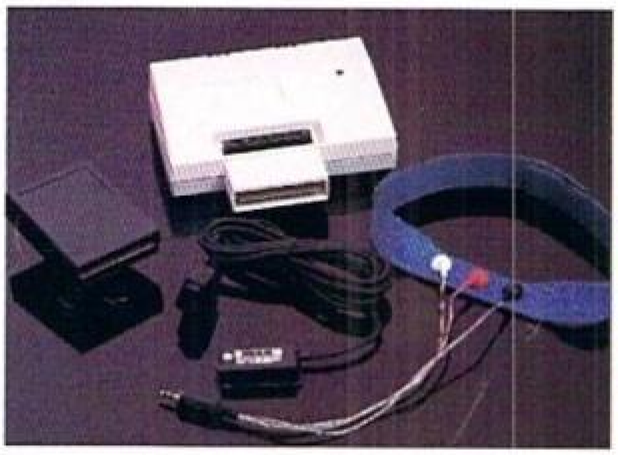

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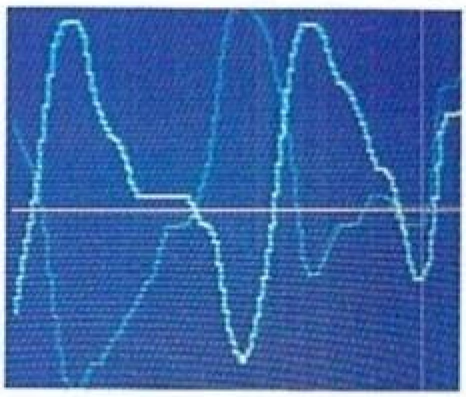

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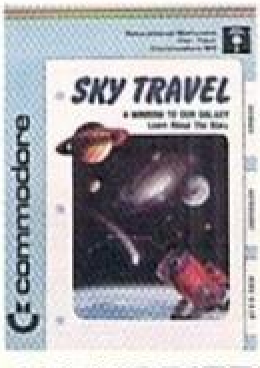
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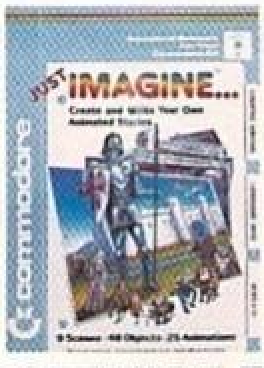
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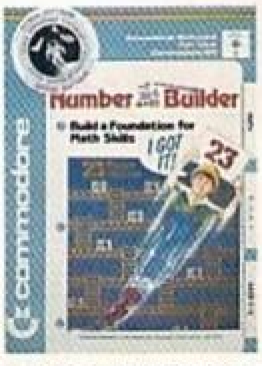
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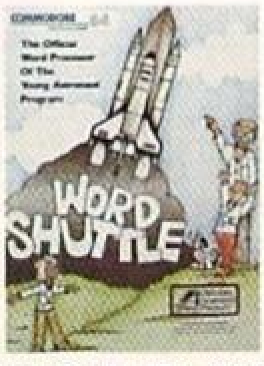
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AUGUST/SEPTEMBER 1986

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LETTERS

Open Letter to User Groups

To the Editor:

I am the librarian for the Central Florida Commodore User's Club, a 300-plus member group in Orlando, Florida. As the librarian, I receive one or two letters a month on a subject that I, and the officers and directors of the club, feel very strongly about: piracy.

This past week brought another letter from someone who seems to feel that all he needs to do is ask someone in a user's group, and they will send him copyrighted software.

Sooner or later someone is going to prosecute some of the piracy that does happen. We all know it exists. But any club who will in any way condone it is setting itself up for a suit. We as a club have worked hard for the assets we have acquired. To become involved in something like this would hurt the whole club. Plus, the officers could be held personally responsible.

Please don't misunderstand. I just want to point out what the letter writer is asking me to risk. If I was to acquiesce to his request, I would be grossly neglecting my duty as a director of the club. But even without that, wrong is wrong. I don't feel I need to elaborate on that statement.

Normally I toss the letters I get. They are not worthy of an answer. This time I just got fed up. Let me close with this plea. While you can't keep people from sharing software, don't let your club be a center for it.

Jim Norton, Librarian
Central Florida Users Club
Orlando, Florida

Secret Code Subroutine

To the Editor:

In the August/September, 1985, issue, you published a jiffy called "A Secret Code Subroutine for the Commodore 64," by Thomas F. Trocco. The concept he uses to protect programs from listing is not very reliable. The fault lies in the loading of the program. Once the program has been loaded into memory, the programmer can use the LIST X-command to list the program past 0. Then using the RUN X command the user can begin executing the program after the password. The only answer would be to automatically execute the program after loading.

Add this line to your program (the line number must be 0)

```
0 POKE 770,131:POKE 771,164
```

In immediate mode type

```
PRINT"(CLR/HOME)":POKE
770,113:POKE 771,168:POKE
43,0:
  POKE 44,3:SAVE"filename",8
```

Now after the program has finished loading, the computer will lock up. Reset the computer and type LOAD"filename",8,1. (You must load using ,8,1. Otherwise the program will not load properly.)

WARNING!!! Always save an unprotected version of your program for personal use.

Now you have a real protected program that cannot be listed or run without the correct password.

Tim Timmons
Pasadena, Maryland

Cryptogram

To the Editor:

In the February/March, 1986, *Commodore Power/Play,* you ran a BASIC program written by Mark Jordan called "Cryptogram." After you have typed in your message and your opponent is guessing, should he accidentally hit the RETURN key as his guess, there is a problem. "Cryptogram" simply prints the input line, "CHANGE TO " again. Consequently, as this line is at the bottom of your screen, everything is moved up one row and the top line is gone forever. Since the encoded message and your previous guesses are on the first two lines, you must, of course, stop and re-run the program. I found a two-line solution to this problem that I would like to share. Simply add these two lines and re-save the program to disk or tape.

```
123 IF ASC (Z$) = 13 THEN 122
127 IF ASC (X$) = 13 THEN 126
```

Ross S. Sorensen
Sioux Falls, South Dakota

Bubble Sort

To the Editor:

Isaac Malitz's article, "Sorting Techniques: The Bubble Sort," in the April/May, 1986, issue was informative and valuable to my school district's classes in computer science. It does a

POWER/PLAY

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nice job actually showing the sorting process in this technique.

I'm sure that other readers may have noticed that it had a glitch. The possibility exists that the same random number might be selected as one of the subscripted variables of A in line 210. This can be avoided by adding the following lines:

```
212 FOR Q = 1 TO I - 1
213 IF A(I) = A(Q) THEN 210
214 NEXT Q
```

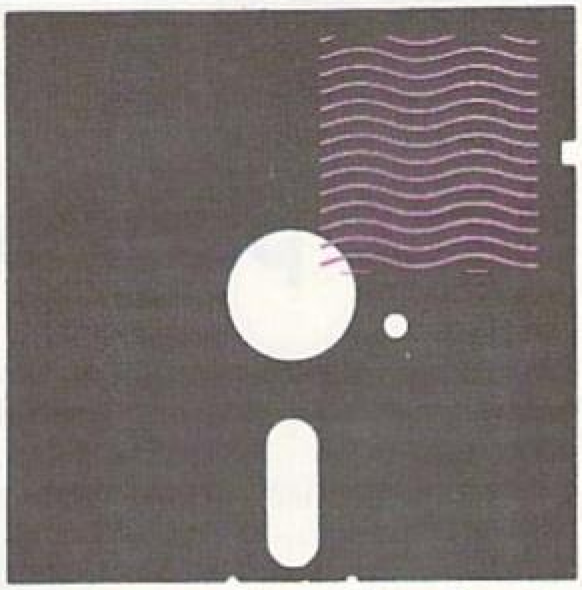
This loop will compare the subscripts of A to each other and, if it finds that it has selected the same number, will loop back to 210 to select another.

Jon-Paul Roden
Vernon, Connecticut

Unscratch Utility on the 1541 Test/Demo Disk

To the Editor:

Many people don't yet know the power of the Unscratch utility on the updated 1541 Test/Demo disk. Few people have actually used it for more than merely recovering accidentally lost program files. I have found a more rewarding way of using this program.



I had obtained a copy of a collection of public domain programs from a friend who obtained his copy from a friend who obtained his from a friend who obtained his. . .I went into my usual routine of playing the new games, and then finally I grew tired of them.

I then wanted to "play around" with the disk, so I loaded my copy of *Kwik-Load* (by Datamost). I selected the "Edit Diskette" feature, chose the default of track 18 sector 00, and lo and behold, I found programs on track 18 that I hadn't seen on the directory! I thought about it for a moment and decided that they must be files that had been scratched many copies and many friends ago.

Ecstatically, I loaded in the Unscratch program from the Test/Demo disk and unscratched those files. To my surprise, most of them actually worked! The few that didn't work were probably over-written by a newly added program and there was nothing to do about them. I have found that many popular programs have that "Edit diskette" feature.

This is a very rewarding feature of a program that was given to us when we purchased our disk drive. I hope this insight is as useful to you as it is to me. I have found about 100 scratched programs that work in my collection alone, and they are good ones at that.

Kevin Miller
Sonora, Kentucky

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Remember the fun of tuning in all those foreign broadcast stations on the short-wave radio? Remember those mysterious sounding coded tone signals that baffled you? Well, most of those beeps & squeals are really digital data transmissions using radioteletype or Morse code. The signals are coming in from weather stations, news services, ships & ham radio operators all over the world. Our short-wave listener cartridge, the "SWL", will bring that data from your radio right to the video screen. You'll see the actual text as it's being sent from those far away transmitters.

The "SWL" contains the program in ROM as well as radio interface circuit to copy Morse code and all speeds/shifts of radioteletype. It comes with a cable to connect to your radio's speaker/earphone jack, demo cassette, and an excellent manual that contains a wealth of information on how to get the most out of short-wave digital DXing, even if you're brand new at it.

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Some basics. Icons are graphic images which represent files or utilities. Each is different, and all are easy to recognize and easy to use.

A menu is just that: a list of functions available for selection. When a menu appears, move the pointer to any item you wish. Click. Click. You're on your way.

A pointer is used to select and activate items. To move the pointer, roll the mouse or trackball or rotate the joystick. Once on target, click once to select; click a second time to activate.

Fonts are a new way of looking at text. Choose from 5 different fonts (with more on the way). Try Dwinelle, or Roma, **bold,** or *italics,* even underline and outline. Need to fit more words on a line? Pick a smaller point size, like University 6 point, and get over one hundred characters per line.

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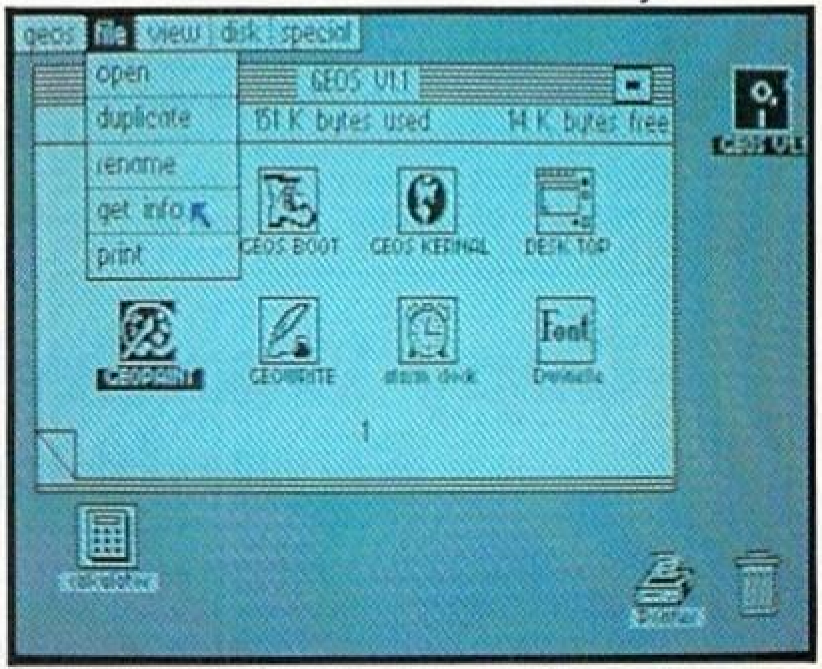
GEOS can be divided into 4 areas: two functional aspects (deskTop and Desk Accessories), and two major applications (geoPaint and geoWrite).

deskTop. deskTop is a graphic interface, making file organization and management easy. As always, you call the shots. Load a disk. Files appear as icons on the disk notepad; to flip through, point at the folded corner and click. Prefer a file appear on a different sheet? Move it. It's easy.



Create a new document or re-name an existing one. Want to copy a file onto the same or a different disk? Fine. Forgotten what a file contains? Select "get info" from the file menu. A description of that file's contents appears. Finished with a file? Print it. Save it. Or drop it in the trash and have done with it. Your call.

geoPaint. A full-featured, color graphics workshop at your fingertips. The pointer operates any one of the fourteen graphic tools and shapes in the drawing menu. Create masterpieces on the Drawing Window. By turns, use a pencil, an airbrush or a paint brush, each with a character all its own. Draw straight lines, squares, rectangles or circles. Fill in with any of the 32 patterns. Switch to pixel-mode, where each dot in a selected section is magnified many times its size for easy manipulation.

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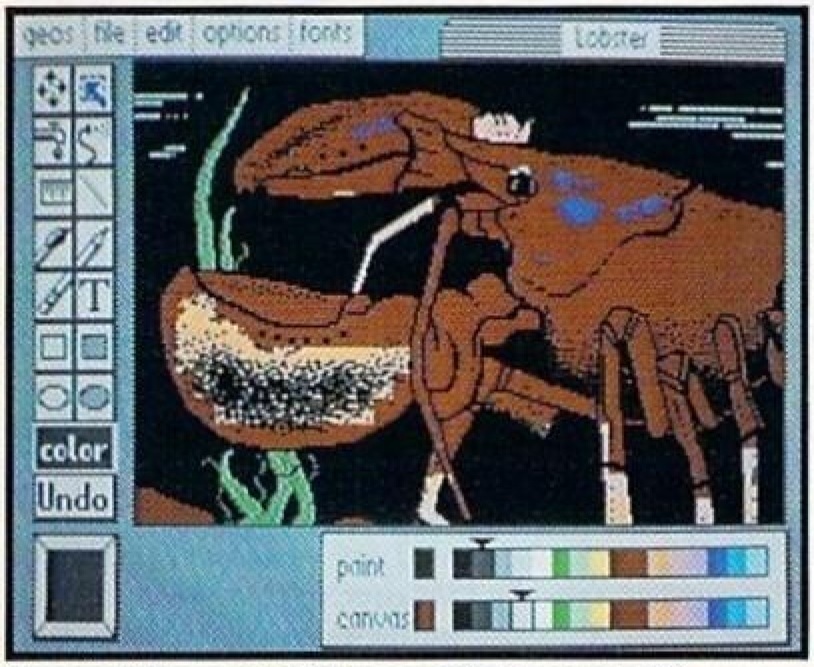
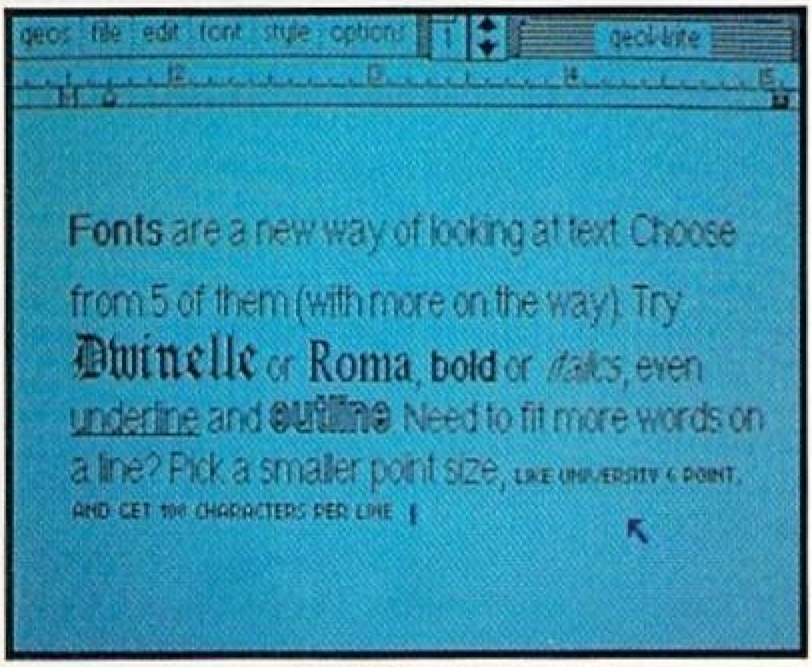


Second thoughts? Erase what you don't want. Or "UNDO" your last act. (If only life could imitate art!)

Add text if you like, in different fonts, styles or point sizes. Even change its position or layout at will.

Move or copy any part of your creation. Once done, you can include your artwork in another document—a letter home perhaps. (Won't Mother be pleased?) GEOS makes it easy.



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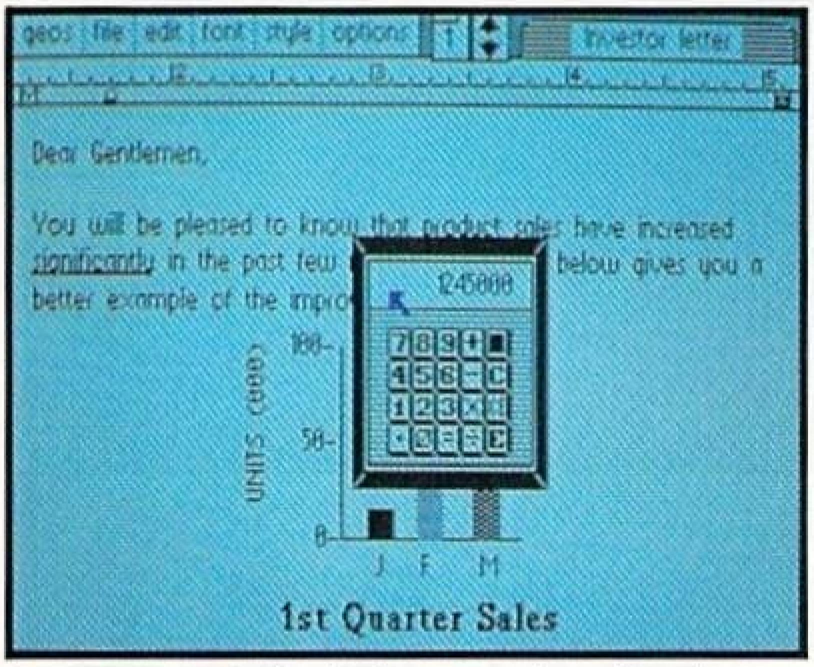
geoWrite. An easy to use, "what you see is what you get" word processor. Create documents. Insert, copy, move or delete text as you wish. Choose from 5 different fonts in many different styles and point sizes. Preview your page exactly as it will appear off the printer. Typists will appreciate tabs, word-wrap and page breaks.

Documents may contain up to 64 pages. What's more, you can move to any page instantly. If you like, you can cut selected text from one section and move or copy it to another. Add graphics from geoPaint. It's a cinch.



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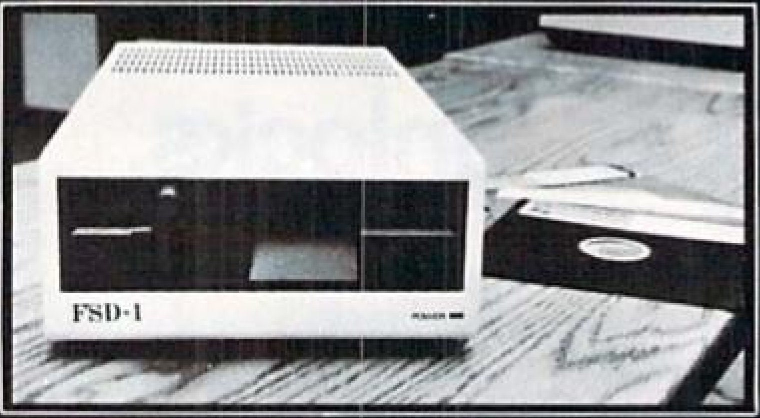

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LETTERS

C 128
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CP/M Information

To the Editor:

Commodore 128 users who are new to CP/M may wish to seek out a local CP/M user's group for information about both CP/M and public domain software that will run on the 128. It might be a good idea to seek out an Osborne users group. Unlike many CP/M users, Osborne users include a number of users of CP/M +, the version of the system used in the 128, so that many 128 users may find kindred spirits among the Osborne users.

In addition, the 128 reads Osborne double-density disks as "native" format, so 128 users can obtain Osborne DD formatted disks from these user groups, stick them in the 1571 and go. A note of warning—watch out for user groups and commercial software vendors that distribute software on Osborne single-density format—the 128 won't read it! If you should happen to get such a disk, check in with a local Osborne user group, where you'll undoubtedly find a friendly soul with a DD Osborne who will move the software to DD format.

One good source of information is the First Osborne Group, Box 3474, Daly City, CA 94015, USA, of which our local group is an affiliated member organization. We invite 128 users interested in public domain CP/M software to contact FOG for information on local Osborne user groups. Those in the Chicago area should drop us a note at Box 1678, Chicago, IL, 60690, or call our 24-hour RCPM at 312-344-2505. A portion of the system, with downloadable files, is open to the public, as is the message system.

Benjamin H. Cohen
President, First Osborne Group
Chicago, Illinois

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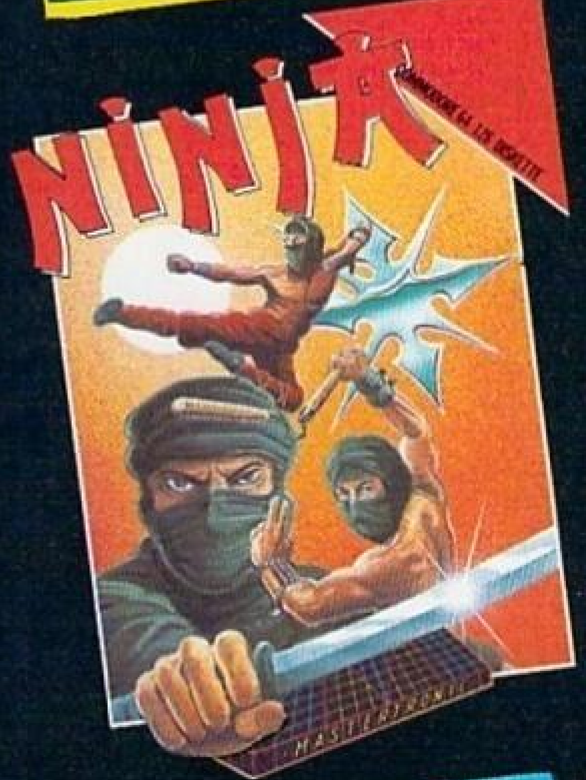
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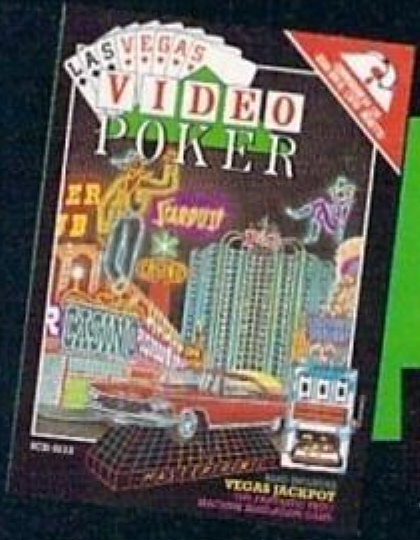
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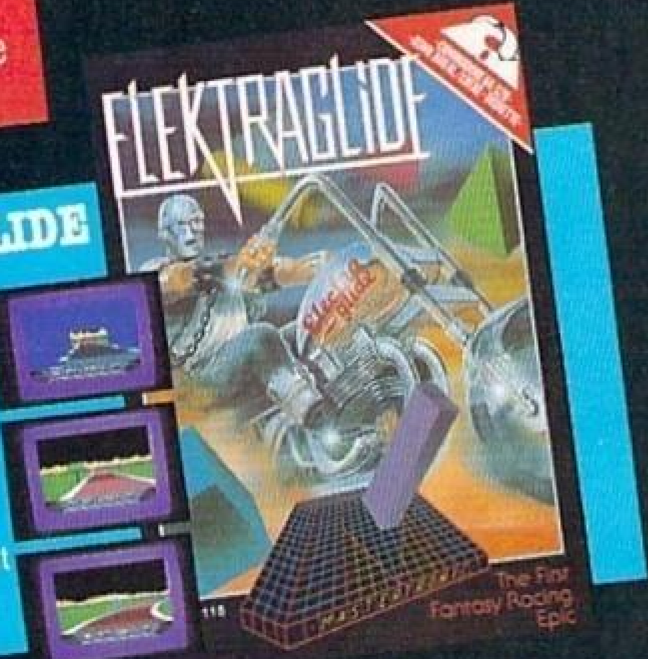
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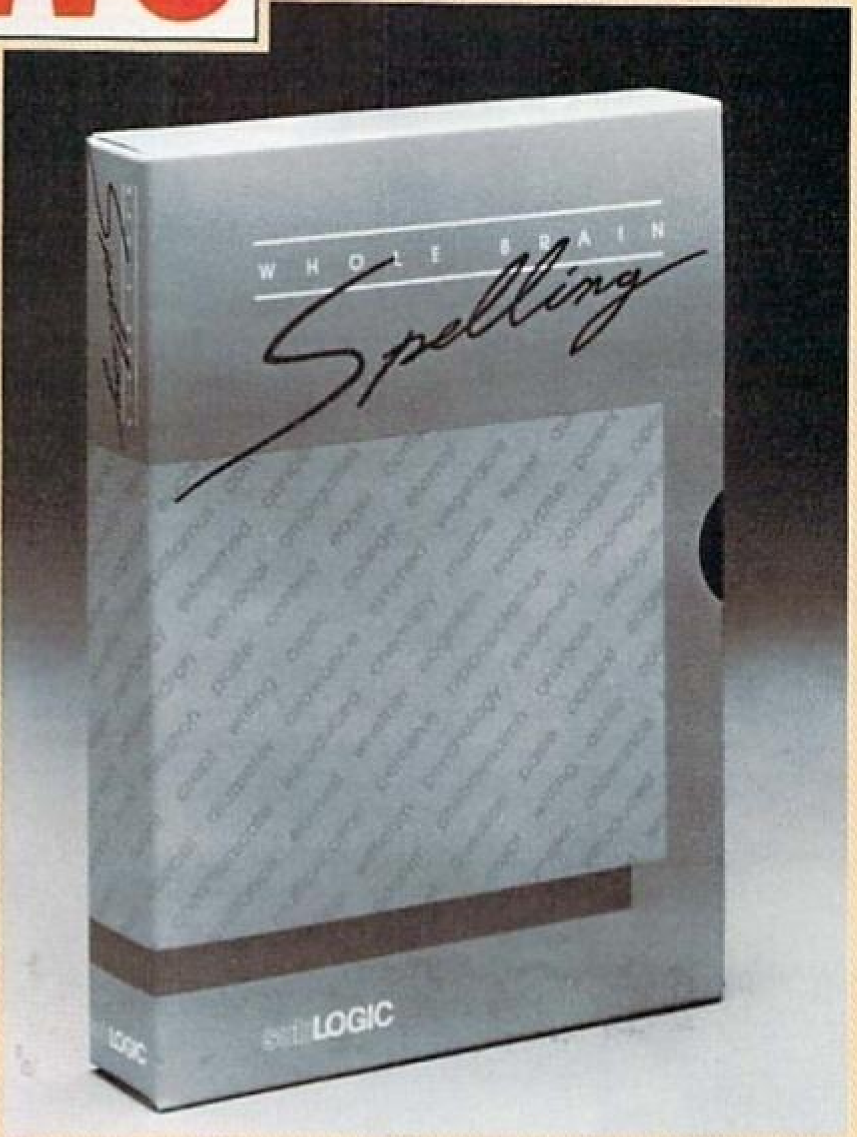
COMMODORE'S NEWS FROM THE FRONT

Game Show Fun

Superior Micro Systems has released **The Ultimate Game Show** for the Commodore 64/128 and Plus/4. The program combines features of popular television game shows like Joker's Wild and Wheel of Fortune to create a fast-paced challenge of the mind. It retails for $29.95. (Superior Micro Systems, P.O. Box 713, Wheeling, IL 60090)

128 Command Center

Ketek has released the Command Center, a space-saving cabinet designed for the Commodore 128 system. The Command Center untangles your wires, unclutters your desk, and puts your peripherals at your fingertips. It includes a built-in power strip with power surge and voltage spike protection, line noise filtering, and six power outlets; built-in drive/CPU cooling fan to prevent overheating; modular telephone plug with its own on-line/off-line telecommunications switch; and a master switch with power indicator light. The Command Center retails for $149.95. (Ketek, P.O. Box 203, Oakdale, IA 52319)



Spelling Program

SubLogic has released **Whole Brain Spelling**, a program for the Commodore 64/128 that helps improve your spelling skills. The program includes 200 ten-word lists organized in order of increasing spelling difficulty. Each correct spelling is rewarded, and the program provides feedback for correction of misspelled words. It is available in six word-list versions: General, A Child's Garden of Words (ages five through nine), Fairy Tale, Scientific, Medical and Business. **Whole Brain Spelling** retails for $29.95. (SubLogic, 713 Edgebrook Drive, Champaign, IL 61820)

How to Succeed with Love and Money

How to Succeed with Love and Money is a computerized version of the self-help book **Everything You Should Know About Yourself**, which sold over 500,000 copies. It comes with graphic picture quizzes and music, and also includes a Zodiac of Love and a slide show. The program for the Commodore 64 analyzes money and career potential, love life and personality through a series of psychological quizzes. It retails for $39.95 (Merrill, Ward & Associates, 1625 S. Sunrise Way, Palm Springs, CA 92024)

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by Alan Rudolf
This celestial almanac puts a wealth of astronomical information at your fingertips.

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by Jerry Jones
Another digital fine arts exhibit. This month's reproductions and commentary focus on the works of Michelango.

—APPLICATIONS—

PAY CHECK
by D.W. Sampson
Use your computer to keep track of your personal payroll information.

FAMILY RECORD SHEET
by D.W. Sampson
This program prints a two-page form perfect for listing genealogical information.

—ENTERTAINMENT—

SPEED BOAT RACE
by W.O. Nelson
Maneuver your speed boat around islands and over jump ramps in this arcade-style game.

ALL SMILES
by Ron Coffen
Are you down in the mouth because you have not played a challenging maze game lately? Cheer up — ALL SMILES is the perfect game to turn that frown upside down.

—TOOLS—

INSIDE THE 1571 DISK DRIVE
by Robert W. Baker
This program lets you get the most out of the 1571 disk drive.

PERFECT INPUT
by Bennett Cookson, Jr.
This program adds commands to BASIC that help overcome some of the INPUT command's limitations.

—C 128—

ROTATION TAG FOR THE COMMODORE-128
by Bruce Jaeger
You must tag seven moving billiard balls with your cue ball in this challenging arcade-style game.

ABSTRACT FOR THE COMMODORE-128
by Jerry A. Sturdivant
This program turns your monitor into a continual display of beautiful abstract images.

ARCHETYPE FOR THE COMMODORE-128
by Mark Jordan
This is the first of a two-part series designed to construct a powerful word processor for the C-128.

COMMODORE-128 DRAWING TABLET
by John J. Kottler
Harness the C-128's graphics capabilities to create beautiful images with a joystick and keyboard inputs.

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COMMODORE'S NEWS FROM THE FRONT

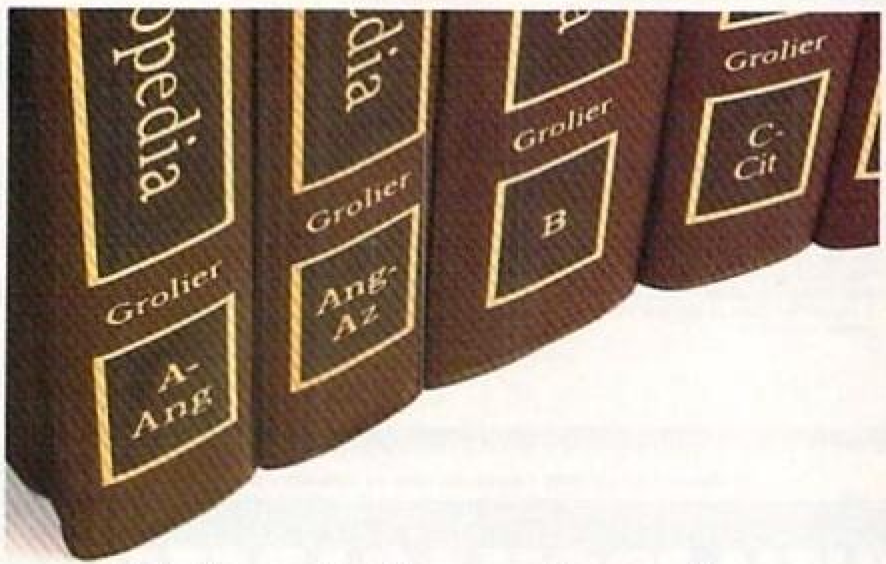
Address Book

Computer Management Corporation has released **NamePro** for the Commodore 64/128, a data base that maintains up to 500 names, addresses, phone numbers and comments per disk. It prints a pocket-sized phone book which can be inserted in a vinyl cover that comes with the program, or prints mailing labels (four sizes), Rolodex cards (two sizes), and regular 8 1/2 by 11-inch pages.

NamePro comes with a separate utility program that lets you subdivide the data base if you need more than 500 names. It retails for $24.95. (Computer Management Corporation, P.O. Box 4819, Walnut Creek, CA 94596)

Disk Organizer for the Commodore 64

Disk-Dexer keeps track of the files and unused storage space on disks, reads the names of various files stored on your disk and prints them on a label. The label shows the name, ID, free space and file name. The program is menu-driven using function keys, and comes with 200 self-adhesive labels. It retails for $24.95. (Enhance Development Company, P.O. Box 1294, Ballwin, MO 63022)



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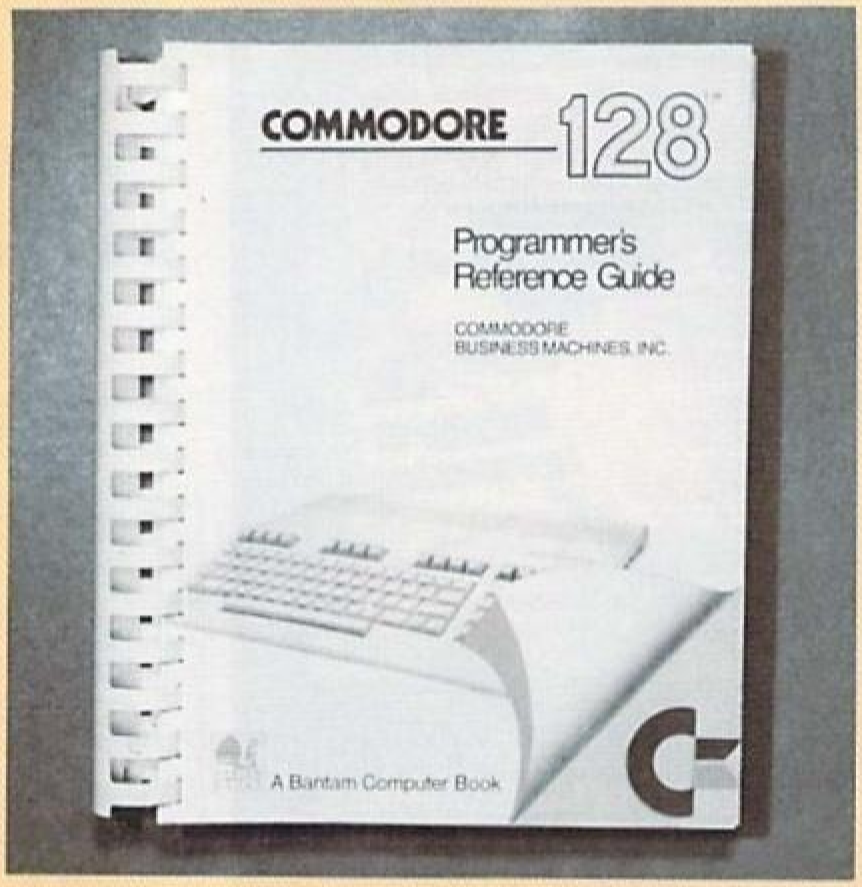
COMMODORE 128
Programmer's Reference Guide
COMMODORE BUSINESS MACHINES, INC.
A Bantam Computer Book

Official 128 Programmer's Reference Guide

Bantam Books has released the **Commodore 128 Programmer's Reference Guide**, the only Commodore-authorized reference guide and sourcebook for the 128. The book covers BASIC 7.0; graphics; sound and music; machine language; the 128 operating system, screen editor and memory maps; and provides an input/output guide, pinout diagrams of primary chips, and schematics of the 128. It retails for $21.95. (Bantam Books, 666 Fifth Avenue, New York, NY 10103)

Disney Characters

ShareData has joined resources with Walt Disney Educational Media to produce programs that feature the popular Disney characters. They will be available in October and will retail for under $10. (ShareData, 7122 Shady Oak Road, Eden Prairie, MN 55344)

Public Domain CP/M Programs

Poseidon Electronics provides a catalog of public domain CP/M programs for the Commodore 128. Programs may be ordered through Poseidon. For more information, contact Poseidon Electronics, 103 Waverley Place, New York, NY 10011.

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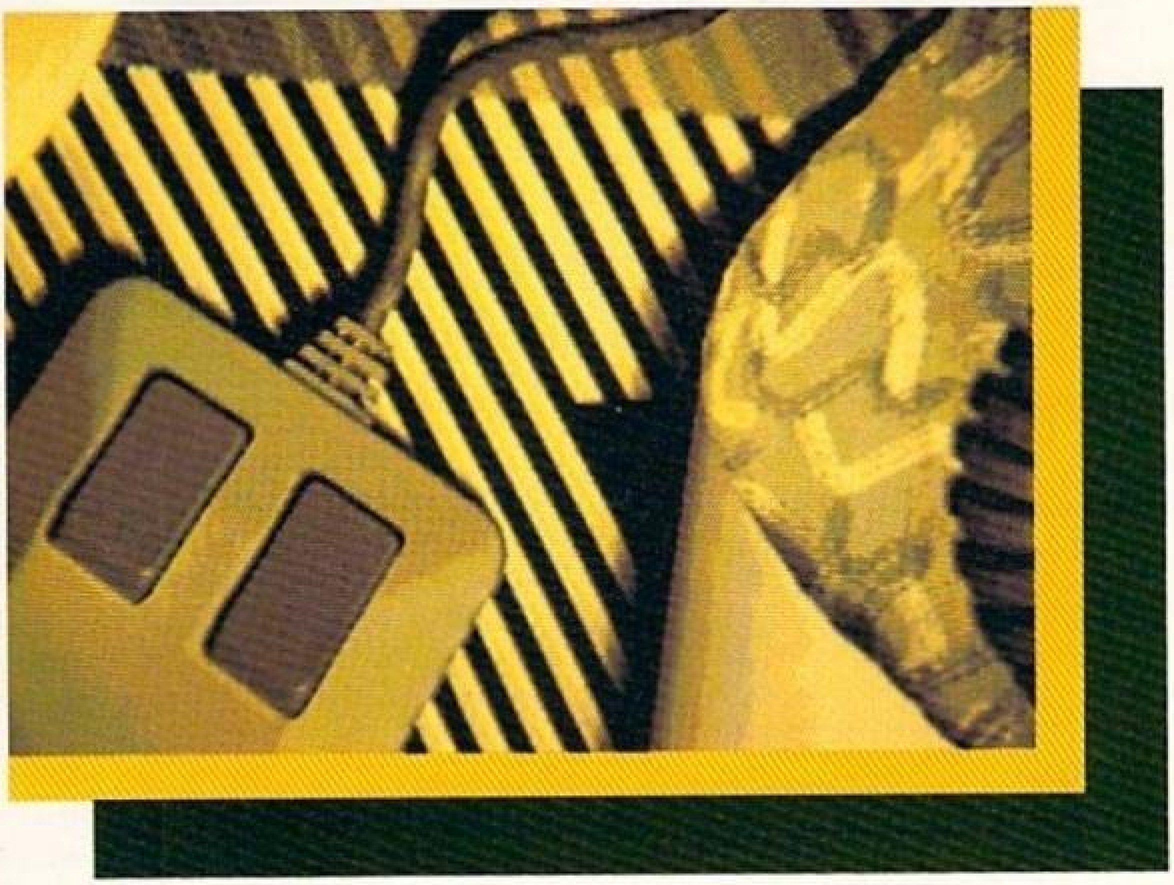
The Creator's Edge



THE AMIGA TECHNICAL REFERENCE SERIES from Addison-Wesley gives software developers and programmers the key to unlocking the power and versatility of the Amiga Personal Computer.

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AMIGA ROM KERNEL REFERENCE MANUAL: LIBRARIES AND DEVICES
Provides a complete listing and description of the Amiga's built-in ROM routines and systems software which support graphics, sound, and animation.

AMIGA ROM KERNEL REFERENCE MANUAL: EXEC
Provides a complete listing and description of the built-in ROM routines and systems software which support the Amiga's multitasking capabilities.

AMIGA INTUITION REFERENCE MANUAL
Provides a complete description of Intuition, the Amiga user interface. Numerous examples and illustrations show how to create applications programs that conform to Intuition's guidelines.

All four volumes in the **AMIGA TECHNICAL REFERENCE SERIES** are available in April through your Amiga dealer, and wherever computer books are sold.

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COMMODORE'S NEWS FROM THE FRONT

128 User's Guide

HPBooks has released **The Essential Commodore 128 User's Guide**. Included are instructions for setting up the 128 system and explanations of educational and recreational software, professional and business applications, word processing, telecommunications, graphics and public domain software. It includes information on Commodore DOS and programming in BASIC with sound and graphics. The book also covers machine and assembly language, and includes a section on hardware interfaces. It retails for $12.95. (HPBooks, Box 5367, Tucson, AZ 85703)

Computer Museum

Computer buffs won't want to miss The Computer Museum, the first museum to trace the history of the computer revolution. Located in Boston, the museum features re-creations of vintage computer installations and interactive exhibits. For a brochure and other information, contact The Computer Museum on Museum Wharf, 300 Congress Street, Boston, MA 02210. The telephone number is 617-426-2800.

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Tic-Tac-Toe for the Commodore 64/128

Brown-Wagh Publishing has released **Cubic Tic-Tac-Toe**, a three-dimensional game for the Commodore 64/128 based on the classic game of Tic-Tac-Toe. The program features six game levels and three difficulty levels: beginner, intermediate and expert.

The object of **Cubic Tic-Tac-Toe** is to place three X's or O's in a row and score more "tic-tac-toes" than your opponent. Unlike the original, players can align X's or O's either horizontally, vertically or diagonally in three dimensions. The game keeps track of wins and scores automatically on the Cubic Score Board, which is on-screen at all times.

The game retails for $29.95. (Brown-Wagh Publishing, 100 Verona Court, Los Gatos, CA 95030)

Psychoanalysis on the Commodore 64

Clinical Interviews has released Volume I of their Clinical Interview series for the Commodore 64. The program places the user behind the therapist's disk to interview several diverse and sometimes frustrating patients. At the end of each session, the program analyzes interview technique and reveals how much information was withheld by the patient. Be prepared for some unique results. **Clinical Interviews, Volume I** retails for $30. (Clinical Interviews, P.O. Box 69, Willard, NY 14588)

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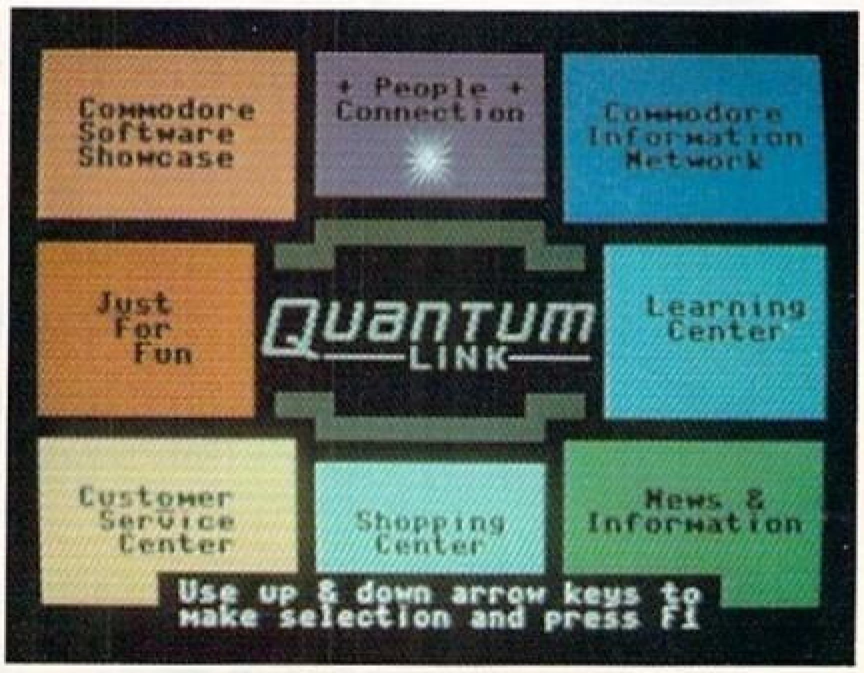
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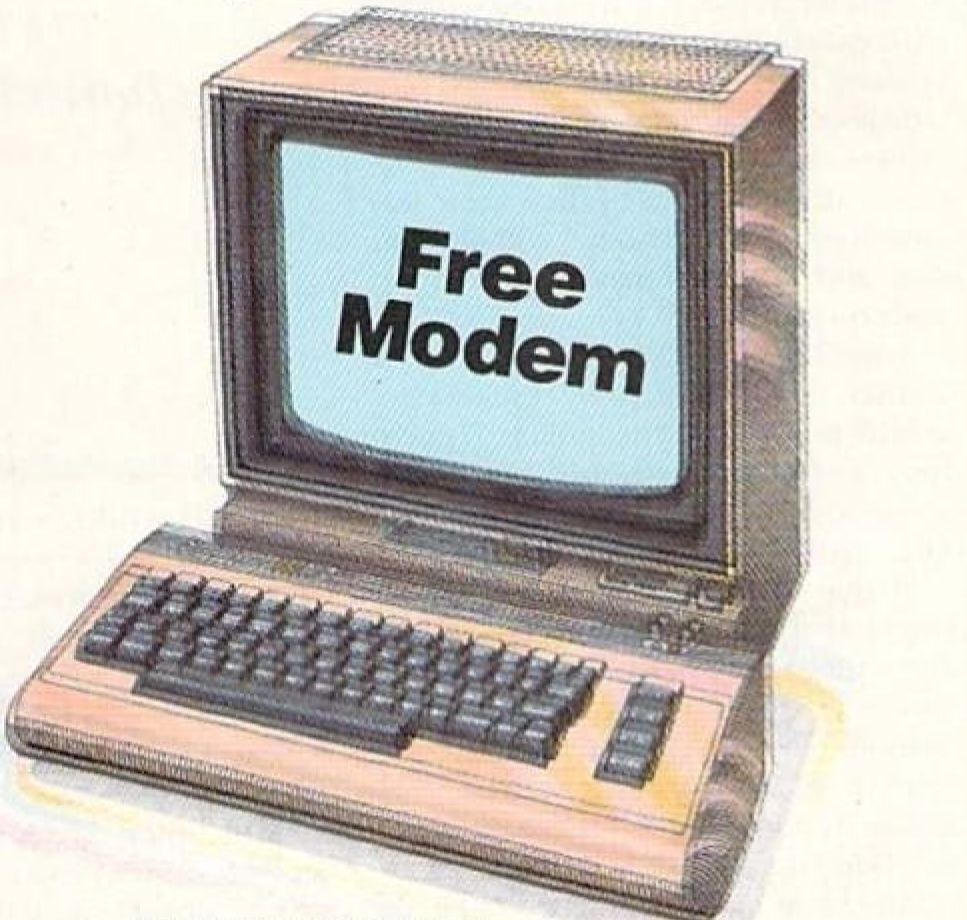

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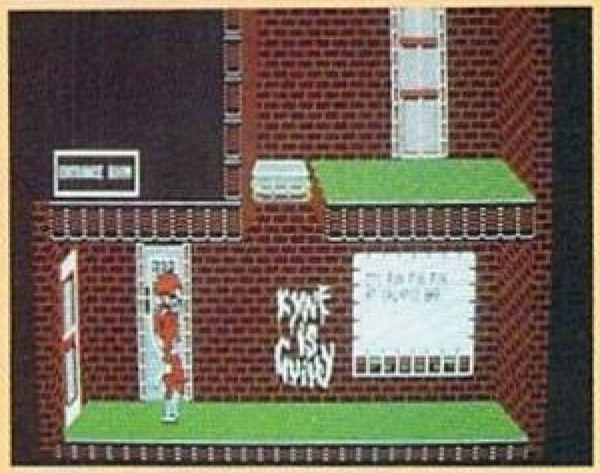
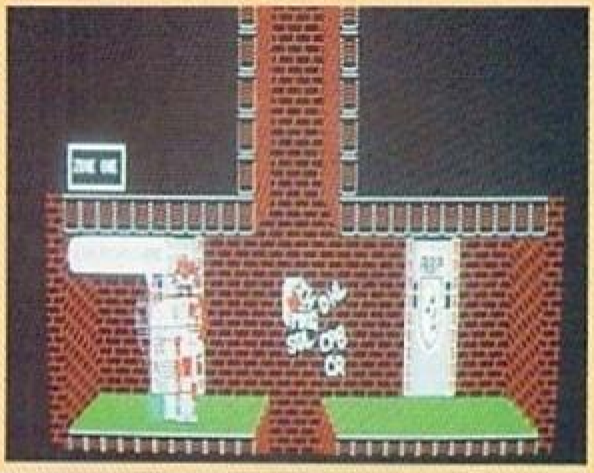
REVIEWED BY ERVIN BOBO

Brataccas

Computer: Amiga
Publisher: Mindscape
3444 Dundee Road
Northbrook, IL 60062
Medium: Disk
Price: $49.95

In the first fully animated adventure for the Amiga, you control your character with a mouse.





As the first feature-length animated adventure for the Amiga, *Brataccas* deserves a close look. By animated, I do not mean that it is a text adventure with graphics, because it is a text adventure only in spirit. There are few words on the screen and there are no replies or directions to be typed. Instead, all the moves of the classic adventures are "acted out," and all control and decision-making are done with the mouse.

Your name is Kyne and you are a wanted man, hunted by the underworld as well as the police. You've been unjustly accused of a crime, and are searching the universe for the one clue that will clear your name.

If that story line sounds thin, remember that simplicity of purpose is the stuff of great adventures, and that most text adventures could be summed up just as easily. It is not the story line, but the complications that ensue from pursuing it that make for a full-bodied story.

After you boot *Kickstart, Brataccas* will self-boot, taking you directly into the title screen and theme song. It is important to note that this game does require 512K of memory in your Amiga, and it won't take you long to understand why. After a suitable pause, both title screen and music fade out and the story begins.

Your first task in the teleport terminal of the planet Brataccas is to find a way out without injuring yourself. Though this may seem simple, mouse control is a bit different than anything you've seen before, and it is going to take practice to become proficient.

There are three methods of movement in *Brataccas* and you will have to master them if you hope to ever master the game. The first, Single Movement, is instinctive: If you wish to move right, drag your mouse right. The second, Emphasized, is accomplished by depressing the right mouse button. This allows you to run, turn, and go through doors. Lastly there is Double Action. With both buttons depressed, push your mouse forward and Kyne draws his sword; pull it back and he sheathes it. Double Action is also the mode to use for all fighting movements.

As in other adventures, *Brataccas* depends on movement through many rooms, observing what you see in each, picking up whatever you think may be useful to you, and interacting with other characters. Communication between characters is by means of comic-strip balloons that appear above their heads as they speak or challenge you. Your own thoughts appear in the same way and, when there is a choice to be made, your balloon will cycle through your available options. When you see the one you want, click the left mouse button.

It is a good idea to get ready for action, for you're going to have to fight your way out of a lot of scrapes in order to stay free and live long enough to find that clue. Unfortunately, by the way, you have no idea what that clue may be. You can only be certain it is somewhere on the underworld planet of *Brataccas*. Keep moving and keep looking.

Graphics and animation are both excellent. There is no music once the initial theme fades, but there are good sound effects as you barge through doors and engage in fighting. After filling in the story background and teaching you how to move, the documentation becomes worthless—but I hasten to add that it was designed to be that way. Read it anyway.

Pressing the HELP key at any time brings up a menu. This gives you options on starting a new game, saving a game, restarting a game, and viewing a movie. The movie is a demonstration of *Brataccas* which I found very helpful. Knowing what could be done lessened my despair at being unable to do it and increased my determination to learn.

Though some of the first people who saw *Brataccas* compared it to *Dragon's Lair* of arcade fame, I think a closer description for Amiga owners would be to ask you to imagine being able to control the figures in the "Robo-City" demonstration that your dealer showed you when you were shopping for an Amiga.

As the first fully animated adventure for the Amiga, *Brataccas* sets a high mark in design and execution, and dedicated gamers will find themselves hoping that this is only the first of many interactive animations. ■

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Go sight-seeing over detailed, realistic United States scenery. High-speed graphic drivers provide an animated out-the-window view in either day, dusk, or night flying modes.

Flight Simulator II features over 80 airports in four different scenery areas: New York, Chicago, Seattle, and Los Angeles. Six additional Scenery Disks covering the entire Western half of the United States are now available in IBM and C64/128 disk formats. Apple and Atari versions will be released soon. Each disk covers a geographical region of the country in detail, and is very reasonably priced.

The Pure Fun of "World War I Ace"

When you think you're ready, you can test your flying skills with the "World War I Ace" aerial battle game. This game sends you on a bombing run over heavily-defended enemy territory. Six enemy fighters will attempt to engage you in combat as soon as war is declared. Your aircraft can carry five bombs, and your machine guns are loaded with 100 rounds of ammunition.

See Your Dealer. Flight Simulator II is available on disk for the Apple II, Atari XL/XE, and Commodore 64/128 computers for $49.95. Scenery Disks for the C64 and IBM PC (Jet or Microsoft Flight Simulator) are $19.95 each. A complete Western U.S. Scenery six-disk set is also available for $99.95. For additional product or ordering information, call (800) 637-4983.

Flight Simulator II
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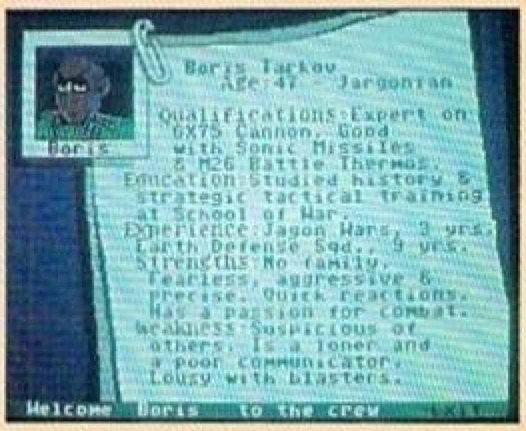
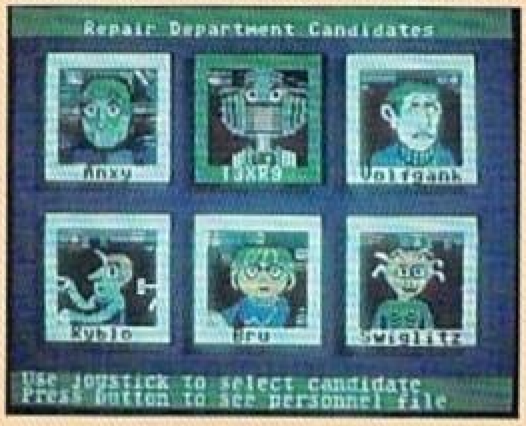
REVIEWED BY MARK COTONE

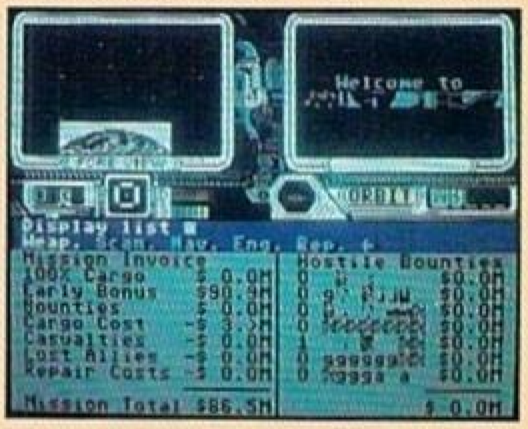
Psi 5 Trading Company

Computer: Commodore 64
Publisher: Accolade
20833 Stevens Creek
Boulevard
Cupertino, CA 95014
Medium: Disk
Price: $24.99

> *For better or for worse, players are given the "help" of a five-member crew, a handful of the most diverse collection of humans and non-humans to ever grace space.*


Boris Tarkov
Age:47 - Jargonian
Qualifications:Expert on
GX75 Cannon. Good
with Sonic Missiles
& M26 Battle Thermos.
Education:Studied history &
strategic tactical training
at School of War.
Experience:Jagon Wars, 3 yrs.
Earth Defense Sqd., 9 yrs.
Strengths:No family.
Fearless, aggressive &
precise. Quick reactions.
Has a passion for combat.
Weakness:Suspicious of
others. Is a loner and
a poor communicator.
Lousy with blasters.
Welcome Boris to the crew


Repair Department Candidates
Use joystick to select candidate
Press button to see personnel file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Display list ■
Weap. Scan. Nav. Eng. Rep. +
Mission Invoice           Hostile Bounties
100% Cargo    $ 0.0M      0               $0.0M
Early Bonus   $90.0M      0               $0.0M
Bounties      $ 0.0M      0               $0.0M
Cargo Cost   -$ 3.5M      0               $0.0M
Casualties   -$ 0.0M      0               $0.0M
Lost Allies  -$ 0.0M      0               $0.0M
Repair Costs -$ 0.0M      0               $0.0M
Mission Total $86.5M                     $ 0.0M
```

The object of *Psi 5 Trading Company* is to move from point A to point B while avoiding death at the hands of a fleet of enemy X. It may sound familiar, but it seems that Accolade's designers don't go for run-of-the-mill heroics, so they've given the usual flight plan a unique wrinkle. This contest not only provides a ship and an assignment, but for better or for worse, players are also given the "help" of a five-member crew, a handful of the most diverse collection of humans and non-humans to ever grace space. If you think holding yourself together on a solo flight was rigorous, try dealing with the fears, idiosyncrasies, desires and demands that etch the personalities of your comrades. The rough ride is about to get rougher.

The game's scenario enlists you as Captain of the Psi 5 Trading Company, a 35th-century shipping outfit on the brink of its most perilous mission. The Parvin Frontier, that recently uncovered quadrant of quality mineral deposits, is currently developing into a certified galactic mess. It appears that the same mother lode that pulled in money-hungry entrepreneurs has also attracted a swarm of some of the universe's lowest dregs. Using strong-arm tactics to clog shipping lanes, these vultures have been successful in cutting off all supplies to the Frontier, holding it hostage under the threat of starvation. Your job is to break their blockade and deliver a shipment of some much needed provisions.

The challenge is set up in two stages, commencing with a prelaunch phase of clerical research into the company's personnel files. There are five on-board positions to be filled (weapons specialist, chief engineer, repair expert, navigational officer and scanner), with six applicants vying for each opening. In a masterful visual display that typifies the game's superior graphics, players must sift through each prospect's records to check on background information pertinent to crew selection. A resume of each candidate, complete with photo, can be accessed to outline past experience, education, specialized qualifications, and overall strengths and weaknesses.

After your crew is assembled, it's time to put your freighter in motion. You select your assignment from three possible destinations and a variety of cargo, with higher payoffs indicating higher risks.

The hub of the action is the ship's cockpit, where you are called upon to orchestrate all the necessary operations for economic and physical survival. The play field is composed of a detailed communications console. An electronic bulletin board covers its bottom half, relaying any computer analyses that may be necessary, and messages from the crew.

Above, gauges, compasses and dials frame two separate viewing screens. The left screen provides a view of space, with all planets, invaders and debris clearly defined. The right screen is an interdepartmental communications link, which enables you to visually interact with crew members. This mini-monitor animation is absolutely superb, with characters working at their jobs, showing concern and emotion with gestures and facial expressions.

You control your cargo ship by directing others. To build speed, you must call on the navigator and ask him to increase thrust. When an unidentified vessel is approaching, have the scanning officer inquire about its intentions and put the weapons specialist on guard. Your hand-picked crew is a capable lot, ready to jump at your every command. But as the game progresses, it develops into more than a simple exercise in job delegation.

This is a game with personalities; one that will test your ability to keep your crew working together as a productive, cohesive team. The profiles reviewed during the selection phase give descriptions of traits and tendencies inbred into each character. Take, for example, Yeela of the weapons department. Although she is touted as a reliable, friendly and loyal worker, her resume also notes that she sometimes becomes emotional and has trouble handling stress. This weakness becomes painfully apparent when a tense, hot battle suddenly brings about some erratic shooting and fearful shaking.

Or how about Ryblo Flam from repairs? His file boasts precise work, but also mentions his lazy streak. Don't be too surprised if he requests a few unscheduled coffee breaks over the course of a mission. And then there's the ever-ready Boris Tarkov, a man known for his passion for combat. You'll learn to keep his reins tight after he takes it upon himself to annihilate a couple of approaching ships, before determining their affiliation. To stay alive for any length of time, a captain will have to be part tactical expert, part juggler, and part babysitter.

Anyone who has ever worked anywhere that functions through a chain of command will feel right at home with *Psi 5 Trading Company*. Action and humor have been successfully melded in an adventure where you, as leader, are only as good as the people you motivate beneath you. And when the going gets tough, you can only hope your hired help is strong enough to pull you through.

Accolade has emerged as a new powerhouse in the realm of Commodore entertainment software. With *Psi 5 Trading Company*, their attention to detail, inventive design and involving game play will keep you hooked.

Psi Postscripts

Four Steps to a Greater Freighter

The documentation provided with *Psi 5 Trading Company* is interesting, precise and complete. An aspiring captain is presented with a thorough introduction that covers individual departmental orientations, a suggested training mission, and playing tips straight from the program's designer, Mike Lorenzen. Below I've listed some hints and strategies that helped me during my short stint as a space courier.

- The novice captain will surely lose a few cargo ships while running through trial-and-error selection of a workable crew. After you finally enlist the five members with whom you feel most comfortable, and you get to "know" them well enough to survive the preliminary mission, try not to change any crew assignments. At this point, you will have grown accustomed to how each department handles different situations, and you will need this crew familiarity to survive the longer, more dangerous deliveries.
- Remember, the quickest route is not always the safest. Periodically check with the navigator to access the changing risk factors of each course. In the early mission, the enemy works in a sort of zone offense. They will not take any overly aggressive initiative, and would rather wait for you to approach before attacking. So if your severely battered craft could use some time for reconditioning, either decelerate sharply or stop completely until the repair department can restore things to ship shape. Just don't stay still for too long. Remember, you're carrying perishables.
- While we're on the topic, it might be a good idea to address priorities. Keeping your ship in one piece will not necessarily allow you to claim victory at Psi. Your job is to deliver supplies. Even if your vessel is dent free, if you lose your cargo, you lose the game. When ordering repairs, have the robodroids work to fix life and cargo support systems first. Then slowly build back your defensive strength by restoring all your weapons systems, power reactors, and shields.
- Most ships you encounter will be pirates. When time permits, the scanning department will examine each approaching vessel to determine its intentions. If you enter a quadrant loaded with ships and wait for full evaluations, you will sometimes run the risk of being caught with your guard down. It is often a good idea to contact the weapons department immediately. If salvos start to fly, give a series of "fire" orders to keep *all* neighboring ships at bay. When the scanning reports are complete, you can still cancel any incomplete attacks on friendly crafts. It is better that a few die so many may survive.

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REVIEWED BY MARK COTONE

Super Boulder Dash

Computer: Commodore 64
Publisher: Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
Medium: Disk
Price: $29.99

In Electronic Arts' *Super Boulder Dash,* the ever resilient Rockford has returned in full splendor, once again willing to brave any danger in his quest for diamonds. If you liked the original, you'll love the sequel, because designer Pete Liepa has created and granted access to 16 new underground mazes, each more intricate and irresistible than before. Spelunking has never been better.

For those of you unfamiliar with all this talk of tunnels and treasure, let me be the first to introduce you to this award-winning arcade world. To better understand the alluring principles of "dashing," let's lay some basics. Imagine that someone has pried open the top of your video monitor, removed all the tubes and circuits, then filled the hollow casing with a heaping shovelful of soil. In essence, the earthy cross-section now packed into your picture tube represents the look and feel of this contest's play field. But the soil on view here is not the every day mud and worms type. Instead, you are peering into a magical mixture of small-scale terrestrial surprises, a combination of dirt, diamonds, boulders, butterflies, fireflies and amoebas that act as the video stomping ground for your on-screen alter-ego, a personable little joystick-controlled excavator named Rockford.

Rockford is an incredible worker, a man who will barehandedly dig shafts, effortlessly remove boulders, and courageously fight foes without the slightest hint of fatigue. With you at the helm, he becomes a miner with a cause. The object of the game is to burrow through a chain of 16 caves, avoiding a series of carefully laid traps, to gather jewels.

Danger comes in many forms. An air assault is mounted by swarms of poisonous fireflies and butterflies. They inhabit various subterranean nooks and crannies, patiently waiting for the wrong rock to be rolled away so they can escape into the network of passages, ready to down Rockford with a mere touch.

From the slime category come fast-growing amoebas. Left unrestrained, these creatures will eat, multiply and expand at an alarming rate. If not contained behind some quickly constructed solid rock barriers, they might feed, stretch and eventually suck everything into their path into their oozing green blobs of bodies.

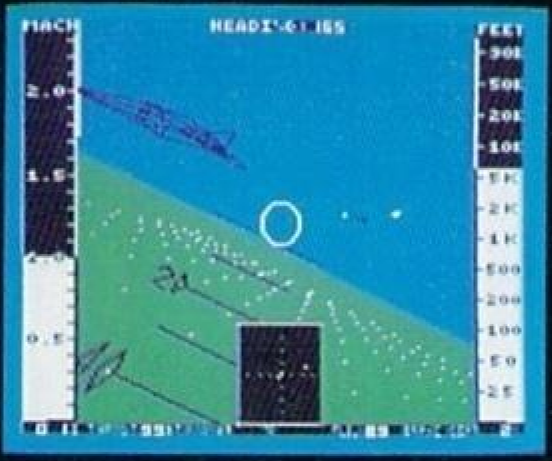
Yet as threatening as these enemies might be, Rockford's biggest nemesis is gravity. Whenever you remove a layer of dirt, any inanimate object left unsupported will come crashing down. This can be helpful when trying to unearth a hidden jewel, detrimental when trying to keep escape routes open, and downright deadly when you happen to be caught beneath an avalanche of stacked stones.

The appeal of *Super Boulder Dash* can be attributed to a combination of elements. The audio is realistic and appropriate, the graphics are colorful and detailed, and Rockford is given an eye-blinking, foot-tapping personality all his own. But one quality raises this contest above the rest: variety.

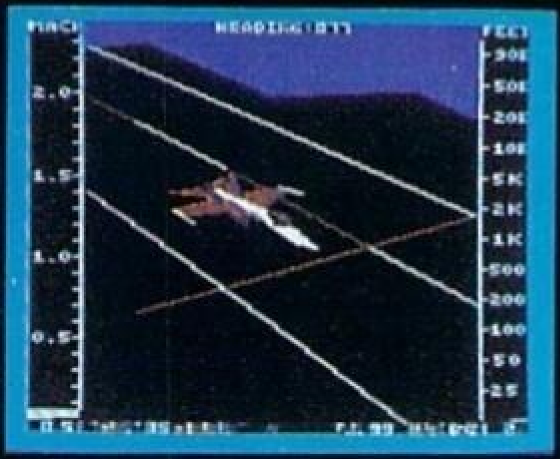
What is sure to compel players to return to this game again and again is that each time Rockford enters a cavern, you are never really sure what's going to happen. There are so many variables at work here that even though the object of the contest is to discover patterns of survival, there is always a surprise waiting just around the corner.

This diversity can be seen on two different levels. When examining the overall design of the program, we see that the contest is actually comprised of individual challenges: each of the 16 caves is a unique puzzle unto itself. True, every screen is similar, in that it requires Rockford to race against the clock to gather diamonds, but the amount of time, the number of jewels, their location, formation and accessibility are factors that are constantly modified. One cave will have diamonds raining from above, while another will have them buried behind a

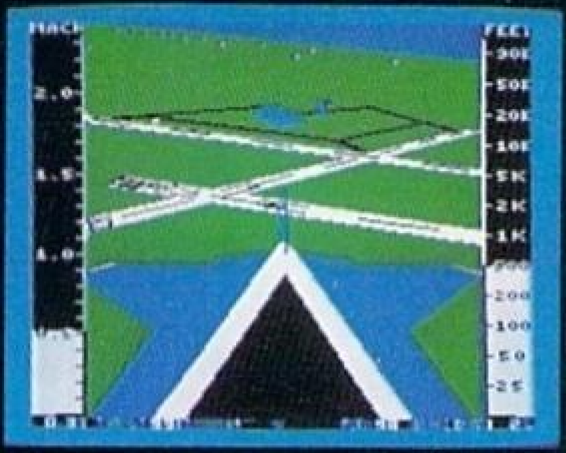
Continued on pg. 172



F-16 Dogfight with Enemy MiG-23 Fighters



F-18 on the Deck of a Nimitz-Class Aircraft Carrier (Control Tower View)



F-16 High-G Pullout over Detailed Wargame Scenery (Rear View)

Jet

From the author of Flight Simulator II comes a new dimension in realism. Jet simulates two fast and maneuverable supersonic jet fighters, a land-based F-16 or a carrier-based F-18. The simulator includes modern electronic flight instrumentation and the most advanced weaponry available. Jet's simulation sophistication, combined with excellent visual attitude references, makes it truly enjoyable to fly.

Easy aircraft control coupled with ballistic thrust gives you the kind of aerobatic maneuverability only a modern jet fighter can provide. Jet's attitude indicator is easy to read no matter what your orientation. A full-screen out-the-window view helps you get the most out of Jet's excellent flight controls. And that's a major consideration when flying at speeds in excess of 1300 MPH.

With Jet you can fly through either structured or non-structured environments. Engage in a deadly variety of combat missions. Explore the wargame territory, or relax by practicing precision aerobatic maneuvers. Load in scenery from optional United States Scenery Disks. You can even load in scenery off the Flight Simulator II disk.

New high-performance graphic drivers provide beautifully detailed scenery in either day or night-flight modes. You can look forward, left, right, rearward, or straight up out of the cockpit with a single keypress. The Jet simulator even includes a special view-magnification feature that lets you zoom-in to identify objects or details at a distance.

Jet will run on any Commodore 64 or Commodore 128 computer with one disk drive and either color or monochrome monitor.

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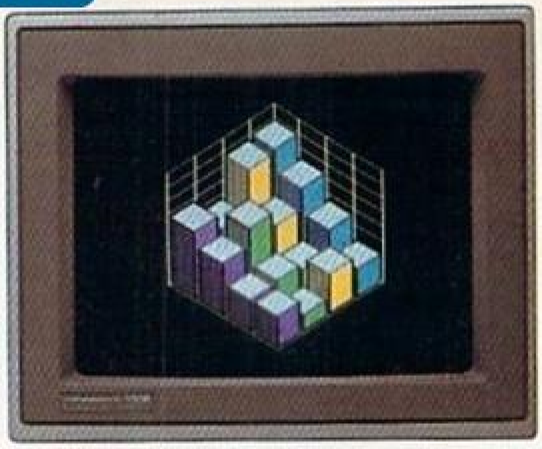
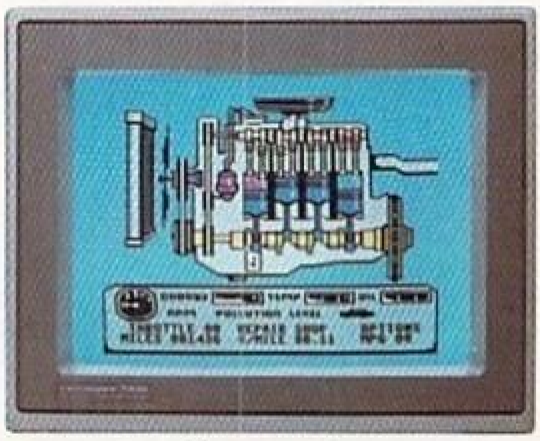
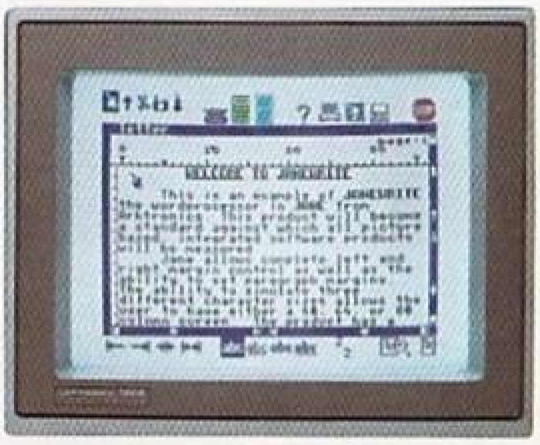


graph a spreadsheet



fix an engine



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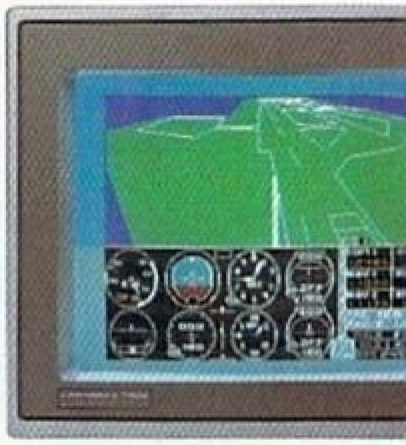

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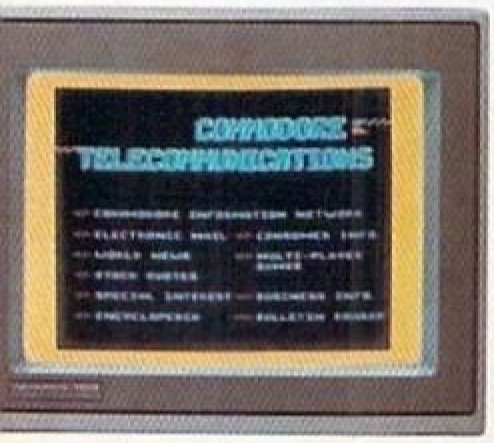
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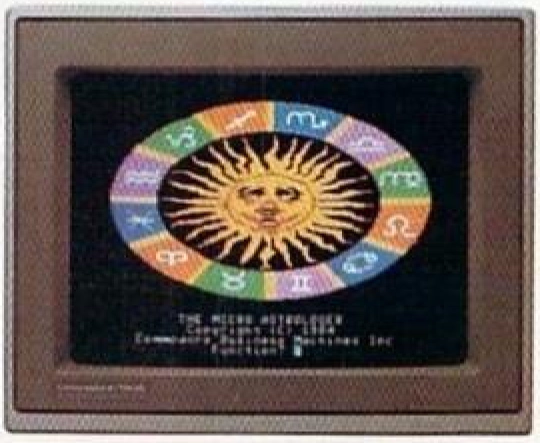
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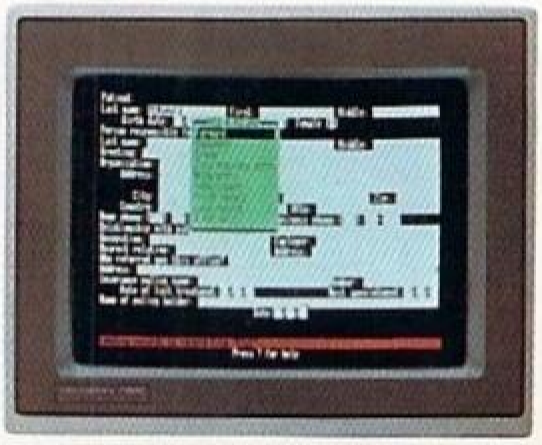
study astrology



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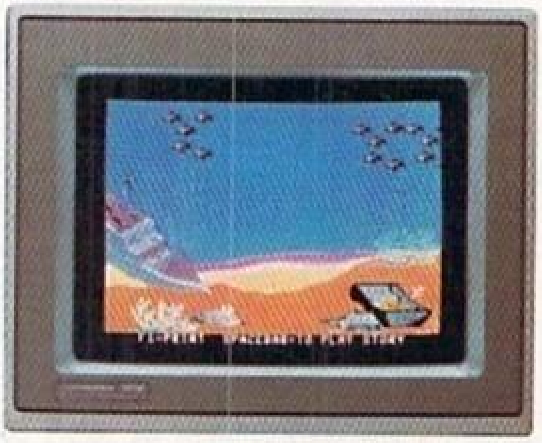
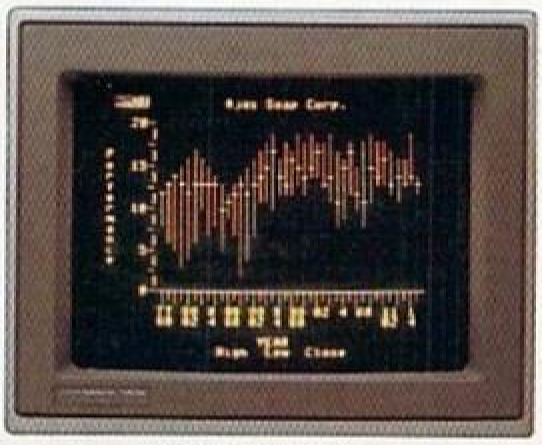


tell a story



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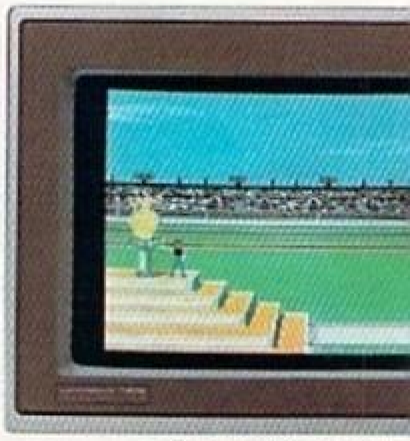

win a gold medal

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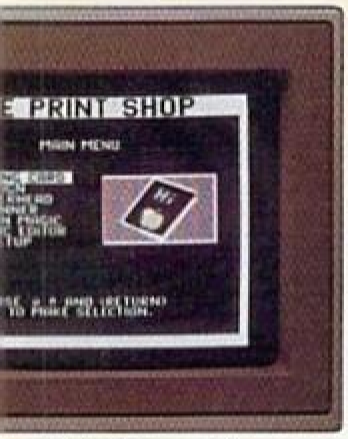
e a birthday card

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design a dream house

tra

master logic

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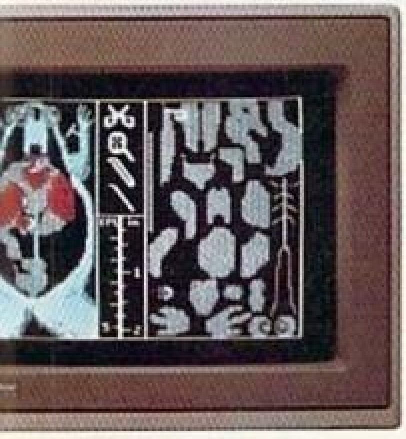
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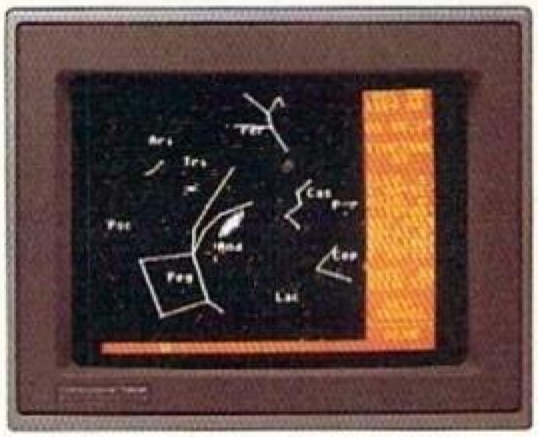
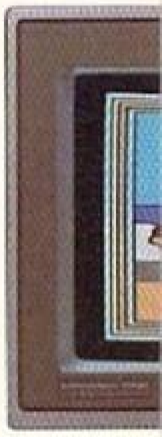

follow the stars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COMMODORE 128 PERSONAL COMPUTER

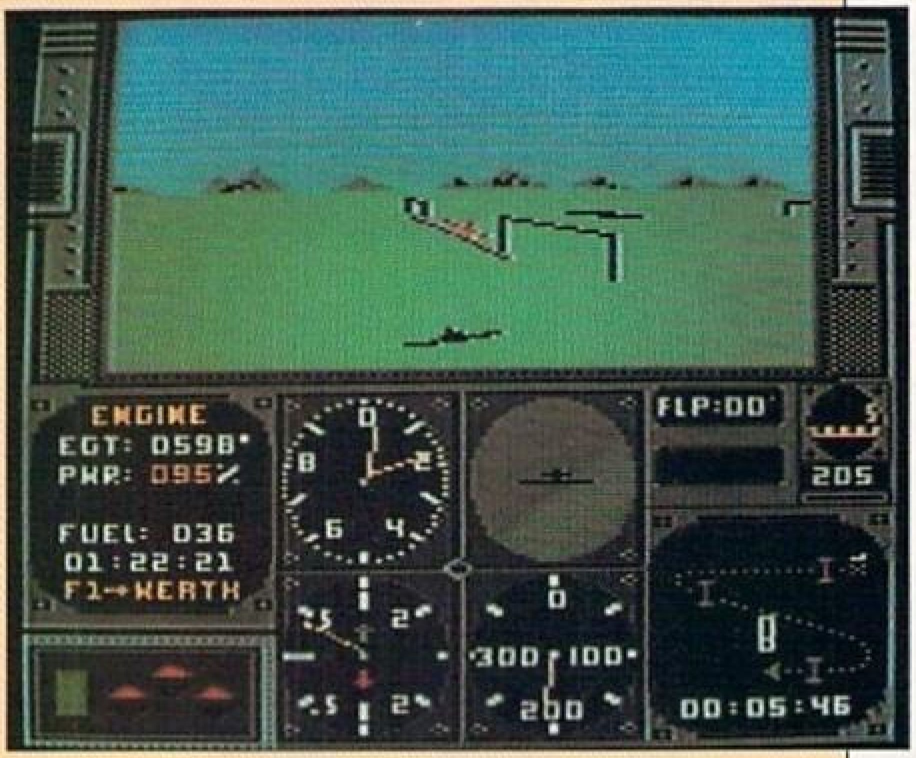
A Higher Intelligence

REVIEWED BY SCOTT A. MAY

AcroJet

Computer: Commodore 64
Publisher: MicroProse
120 Lakefront Drive
Hunt Valley, MD 21030
Medium: Disk
Price: $34.95

> *MicroProse has given those of us who are chickens the chance to experience the thrills of AcroJet flying from the safety of our homes.*



Try to imagine a bullet about 15 feet long and 6 feet tall that can travel up to 346 miles per hour. Now imagine attaching a seat and a few wings, and you've got a pretty good idea of what a BD-5J is all about. *AcroJet* by MicroProse is billed as an advanced flight simulator and rightly so. Make sure your insurance premiums are paid up, because you're in for the ride of your life.

Designed primarily as a high-performance aerobatic stunt plane, the BD-5J flies like a possessed hornet. In fact, the only thing more incredible than this plane is the pilot inside. Pilots are always at risk whenever they fly, but this is something else entirely. BD-5J pilots straddle a fine line every time they take off.

Luckily, MicroProse has given those of us who are chickens the chance to experience the thrills and sometimes tragic spills of AcroJet flying from the safety of our homes. Sunday drivers beware—this is no leisurely spin down a country lane. The BD-5J is so fast and unpredictable, all it takes is one second of indecision and you're history.

These ominous warnings are really just a tease, however, to set the mood. As a tribute to the sport of aerobatic (stunt) flying, *AcroJet* is fast-paced, challenging and above all, a lot of fun.

Set up like an actual air show, the game lets one to four players compete in as many as ten events. Competition takes place on a large square airfield with a short landing strip in the middle. Depending upon the event, the airfield also features pylons in each corner and ribbon gates at various points. The ten events, in order of difficulty, include the Pylon Race, Slalom Race, Ribbon Cut, Inverted Ribbon Cut, Ribbon Roll, Under Ribbon Cut, Loop, Spot Landing, Cuban Eight and Flameout Landing. During pilot registration, you can choose from one of four modes of play: the Decathlon (all ten events), the Pentathlon (any five events), a single event, or an unlimited event (where you make the rules).

A wide variety of skill levels provides endless challenges, and allows handicapping of experienced pilots when they compete against novices. Prior to competition, each pilot can select one of four difficulty levels for both wind conditions and jet performance. There is also a setting for ground or airborne takeoffs and landings. Your score is judged on a combination of the above variables, the rules within each event, the overall difficulty, and your final time. High scores are saved to disk for every event in each mode of play.

The BD-5J cockpit display is by far the best MicroProse has ever designed. The colorful gauges are very easy to read, set against a textured outline of gray and black. Flight-simulator veterans will feel at home with all the essentials: altimeter, vertical velocity, airspeed, altitude, flaps, landing gear, compass and horizon indicators. Other gauges include digital readouts for engine power, exhaust gas temperature, fuel and weather information.

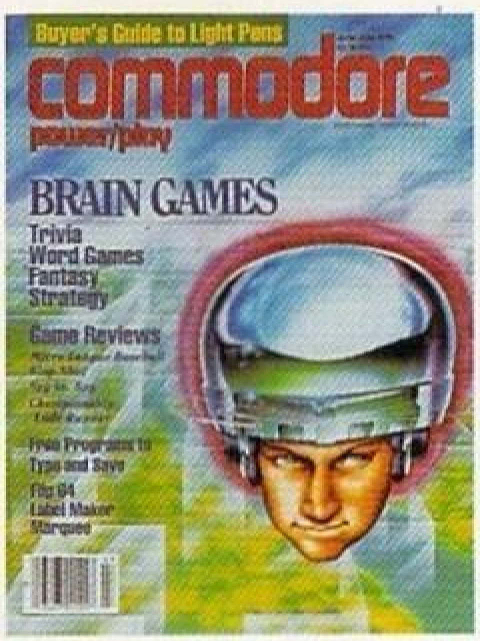
The view from the outside is a 3-D rear-end perspective of your plane, as if you were flying directly behind it. First used by MicroProse in their popular *Solo Flight* simulation, this "in-the-slot" technique allows for greater control of your jet at all times. A small course map at the bottom of the control panel provides an overhead view of the airfield, indicating your position and the layout of each event. If you become disoriented during an event, use the ball compass and course map to quickly find your position on the field.

Controlling your AcroJet requires a combination of joystick and keyboard input. Moving the joystick controls the jet's elevator and aileron flaps, causing it to climb, dive or bank. Pressing the fire button while banking controls the rudder, executing an aileron roll. At least one event requires that you master this skill, performing precise 360-degree forward rolls.

Keyboard control is kept simple so you don't have to take your eyes off the screen for too long. The number keys control the throttle, while other keys activate special functions such as the landing gear, wheel brakes, flaps, speed brakes and view (forward, left, right and rear). If you become confused during a flight (and you will), a pause feature is included. Use it often to study the instruments and get a grip on the situation.

Continued on pg. 172

MACHINE LANGUAGE.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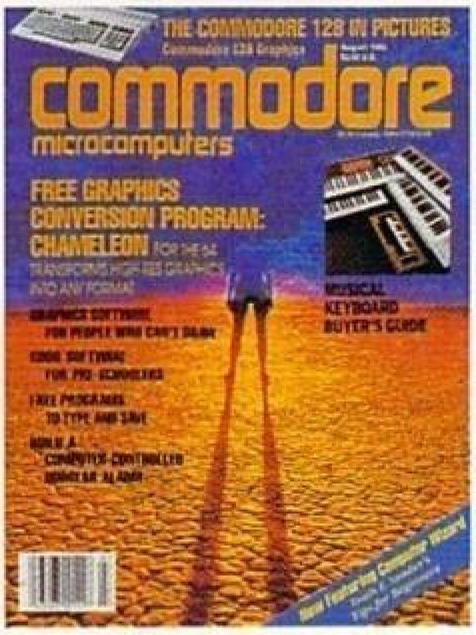
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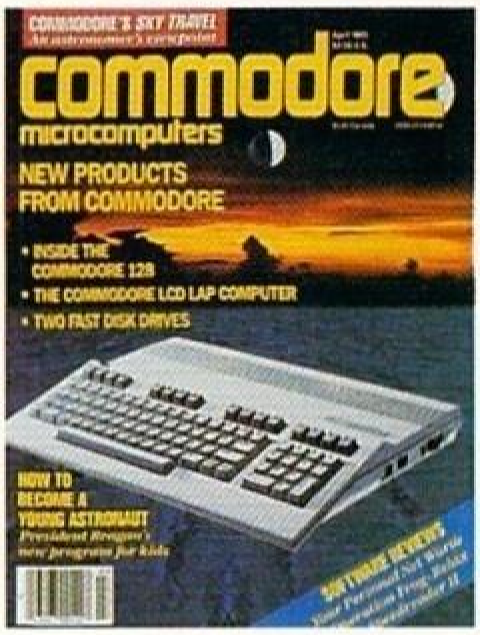
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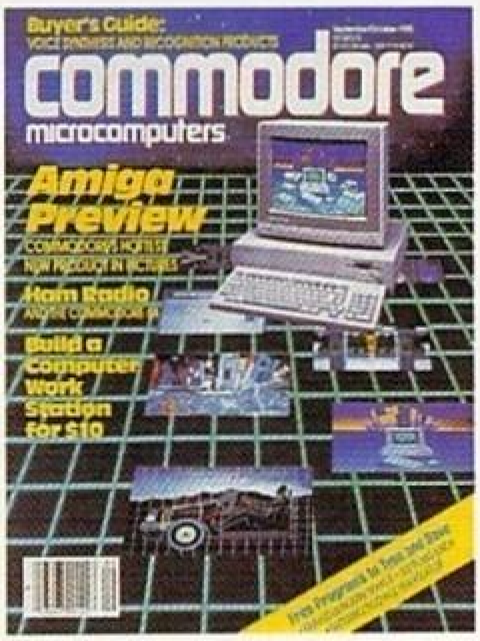
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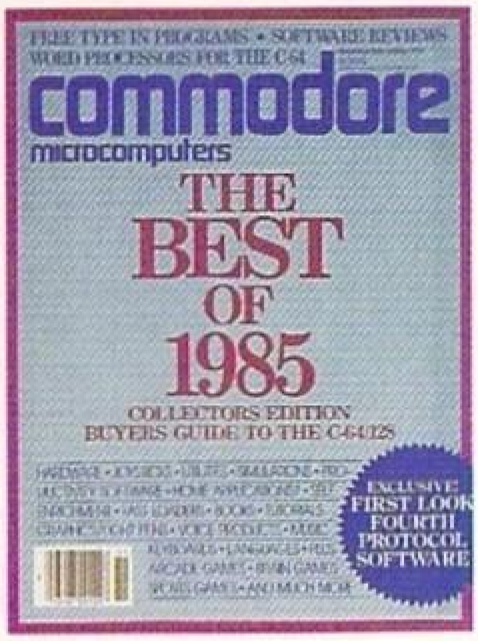
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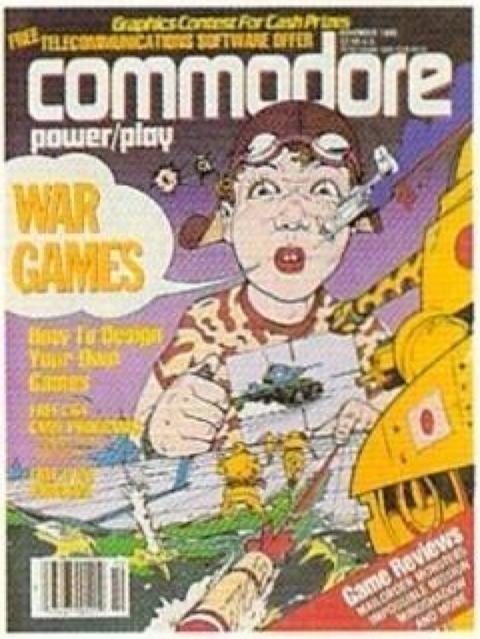
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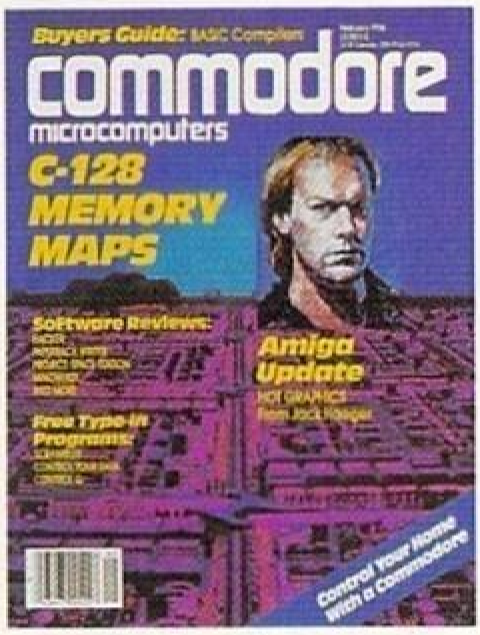
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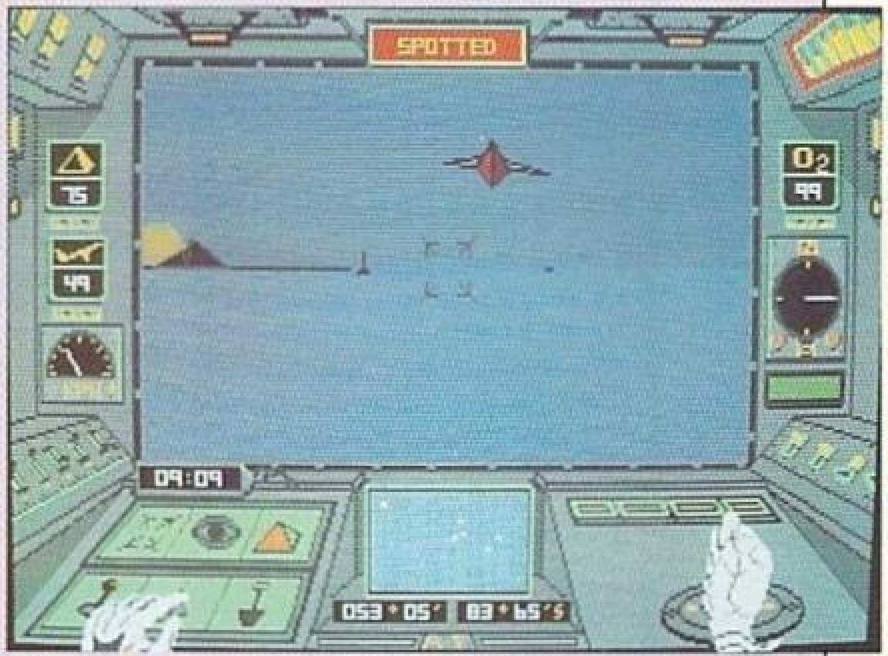
REVIEWED BY ERVIN BOBO

Arctic Fox

Computer: Amiga
Publisher: Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
Medium: Disk
Price: $39.95

As commander of the Arctic Fox, you must destroy tanks, recon flyers, fighters, and oxygen converters, then slip through a weakened force field and destroy enemy headquarters.



The only thing that keeps *Arctic Fox* from being a simulation is that you can't simulate what doesn't exist. Armed with missiles, shells and mines, and with a top speed of over 100 kilometers per hour, the Arctic Fox is thought to be the only weapon that can penetrate the alien defense perimeter that has been secretly established at the South Pole.

Surrounded by a force field, the enemy is converting Earth's oxygen into a mixture of ammonia, methane and chlorine. Your mission as commander of the Arctic Fox is to destroy tanks, recon flyers, fighters, and oxygen converters, and then slip through the weakened force field and destroy enemy headquarters.

Your view is of the terrain immediately before you, and below that is a smaller screen that gives an overhead radar view of the surrounding area. On either side of the view screen are instruments to indicate course, location, oxygen remaining, speed, position and remaining armaments.

In the foreground is a control panel and a pair of hands. The hands are yours. Move the joystick and you'll see the right hand make a corresponding move.

As if this were not enough, the enemy vehicles and the terrain exist in three dimensions. When rolling over the remains of a destroyed tank, the Fox lifts on one side as engine speed increases to overcome the obstacle. And as you climb a hill, the Fox tilts upward, then levels as you reach the top. To see the other side of a mountain, use the cursor keys or joystick.

You may select from one of four levels. The first is an enemy preview. Enemy vehicles appear in the distance, rush toward you, turn and pause. Because the Amiga allows for rapid redrawing, the 3-D effect is both smooth and stunning. Below the view screen, text displays the strength and armament of each vehicle.

Level two is for practice. Here enemy armor is light and the enemy is not too smart. With unlimited weapons, you can have a field day as you practice destroying aliens. Level three should be thought of as advanced practice, for here, too, the enemy is not as strong and his numbers are limited. The fourth level is tournament play. Here the odds are against you, your weapons are limited, and the enemy is much more intelligent—forcing you to develop a strategy to go along with the arcade aspects of the game.

If you've already been spotted, should you destroy the unarmed Recon Sled or should you save your ammunition for the fighting vehicles? Should you use a missile to see around a mountain or conserve it to use against a Flyer? Should you drop mines now or wait until you're being chased?

In addition to out-foxing the enemy, you must contend with the weather. Because of the interaction of the enemy atmosphere with the remaining oxygen, electrical storms are common. The sky darkens, thunder roars, your radar screen is scrambled and useless, and the enemy suddenly appears much closer than you thought. Or you may find yourself in a blinding blizzard, your video sensors useless, your only hope that your radar will stay unscrambled until the storm blows over.

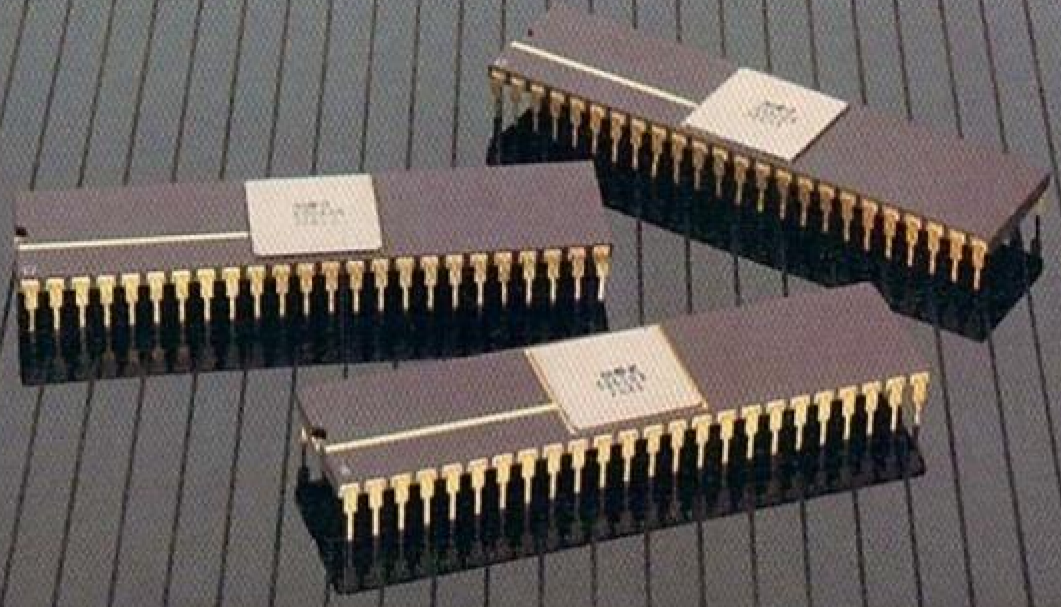
The terrain is also hazardous. A field of snow powder will slow you down, a crevice in the ice field will swallow you, and hills and mountains must be negotiated.

At the end of each round of play, a scorecard appears showing the enemy vehicles and structures destroyed. It also will tell you the precise time you died as well as the cause of your demise, then converts all this information into a numerical score.

The sounds of *Arctic Fox,* both in quality and multiplicity, are the best I've heard. You expect the sound of explosions, of course, but add to that the constant sound of your treads swishing on the ice, the purr of your engine, the warning klaxon letting you know you've been spotted, the chirping radar return telling you a Recon vehicle is locking onto you, and the roar of a launched missile. There are so many sounds that I'm still not sure I've heard them all.

The graphics are superb. There is a possibility some people will be disappointed by the blocky appearance of enemy vehicles or by the pyramid shape of the mountains, but these drawings need to be simple in order to conserve memory for all the sounds and 3-D effects.

Without a doubt, *Arctic Fox* is the state-of-the-art in arcade/strategy games, made possible only through the power of the Amiga and, like the Amiga, will be setting standards for a long time to come. C



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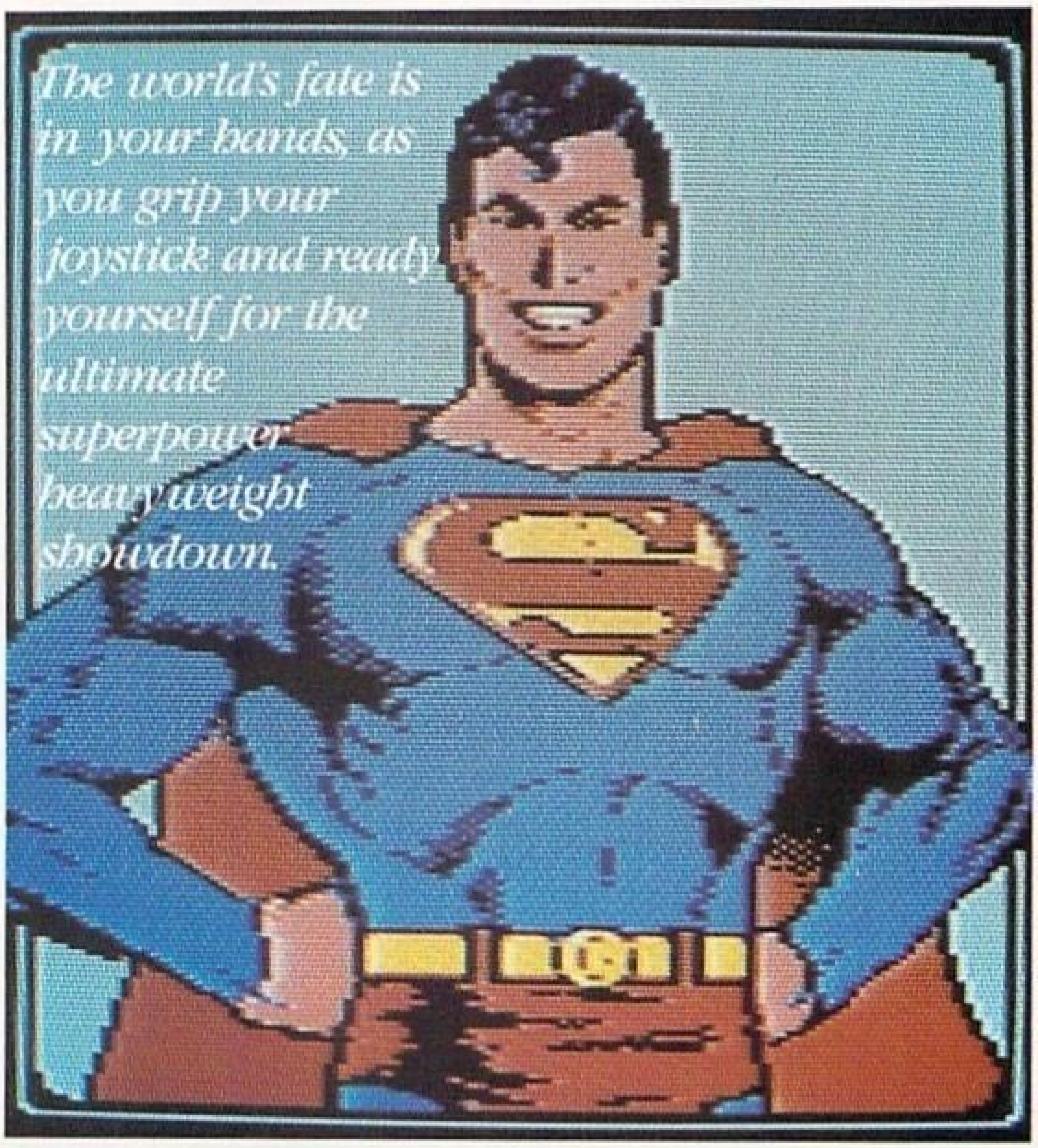
REVIEWED BY MARK COTONE

Superman: The Game

Computer: Commodore 64
Publisher: First Star Software
18 East 41st Street
New York, NY 10017
Medium: Disk
Price: $29.95



The world's fate is in your hands, as you grip your joystick and ready yourself for the ultimate superpower heavyweight showdown.

We all know what he can do to speeding bullets, powerful locomotives, and tall buildings. But our Man of Steel has never come up against a challenge as tough as First Star's *Superman: The Game.*

In his never-ending battle for truth, our caped crusader is pitted against the infamous Darkseid. If this madman has returned, you know he has renewed his quest for the Anti-Life Formula (ALF), a secret formula that gives its possessor mind control over others. In the past, Superman has been able to thwart him, but now the world's fate is in your hands, as you grip your joystick and ready yourself for the ultimate superpower heavyweight showdown.

The designated war zone is the familiar Metropolis, whose citizens are about to become unsuspecting pawns in a strategic game of life and death. Through some bizarre physiological studies, Darkseid has learned that the basis of the ALF lies dormant in the minds of a few unknown earthlings; people who are not even aware that they hold such power. The evil mastermind plans to raid the city, imprison its inhabitants, and scan their brains to uncover the pieces of this ALF puzzle. If successful, it will only be a matter of time before the entire human race will become subservient.

To draw battle lines, Metropolis has been divided into six sectors. Three of these sectors represent the city streets, with buildings, sidewalks and curbs defining maze-like passages. The remaining screens display three adjoining sectors of Darkseid's subterranean lair, an underground cavernous network which houses the much feared mind-scanner.

Throughout the game, Darkseid will try to force as many citizens as possible into the probing room at the far end of his prison. As Superman, your object is to foil your arch rival's heinous herding by picking up and flying as many helpless people as you can to the safety of the city's outer limits. At game's end, whoever has gathered the largest crowd wins.

Darkseid's principle power comes from the "Omega Effect," which allows him to emit forceful bolts of energy from his eyes to either stun an attacker or transport a targeted person to any point throughout the city. Superman can also rely on his own optically generated artillery. By channeling his X-ray vision into a more compressed beam, he can send off bursts of heat energy. Any time either combatant is nailed by an opposing ray, he is slightly weakened and visibly jolted for a few seconds.

These unconventional weapons, coupled with "deflectors"—on-screen walls used to redirect offensive blasts—add an interesting level of strategic depth to the Metropolis round-up. No matter how many citizens you are able to sweep away, if you absorb too many Omega rays, your super surrogate can be drained to the point of complete, fatal exhaustion. Positioning, speed and luck will all play a part in the winning approach. A band located at the screen's bottom should help you to avoid any calamities by giving a shot-by-shot tally of each character's score, strength and number of people saved.

Designer Fernando Herrera understands that when working with comic book inspirations, brain games alone are not enough. Just as in Superman movies and television shows, it is crucial that this program's plot contain enough contrived situations to showcase our man's sensational physical powers. Standing for Truth, Justice

The infamous Darkseid is back, and if he is successful, the entire human race will become subservient.

and the American Way is nice, but only if you can catch some excitement along the way.

With crisp animation and colorful graphics, players are taken on an enthralling tour through a diversified arcadian collection that tests adeptness from all angles. None of these games-within a-game could stand alone, nor will any win awards for originality. But these may represent the most expansive collection of arcade contests ever assembled under one title.

Options let players tailor the contest to their taste: playing with or without Combat Zones, against human opponent or computer, on any of three skill levels. For optimum enjoyment, I suggest that you get involved in some two-player face-offs. It's here that you lose the predictability of a computerized adversary.

All in all, when examined piecemeal, one might be hard pressed to find something terribly unique with *Superman: The Game*. But in the end, the whole adds up to much more than a sum of its parts. And like its namesake, this game, although somewhat hackneyed, is still a guaranteed thrill. C

Superman: The Game Plan

City Salvation Secrets for Mortal Men

Playing the role of the super hero requires more than colorful tights and a bright cape. There has to be a plan of attack. Winning on the Metropolis screens is a matter of keeping one eye on the citizens, one eye on the deflectors, and both eyes on Darkseid and his Omega Ray. That trick will take a little practice. But when you are involved in any one of the fistful or arcade challenges, there are some preset strategies that can be used to back Superman's reflexes. The letter preceding each tip is the letter First Star uses to identify each contest.

A) In this three-dimensional street fight, Darkseid's deadly assault comes from all angles. The documentation suggests that Superman fly in the middle of the screen to avoid the oncoming barrage. But I have found that my surrogate will take less of a beating by hugging either one of the side walls. Hitting these barriers will not affect your strength, and not only will this move cut down on the amount of artillery that has to be monitored, but it will also help you fly steady in the shifting air currents.

B) Place your Man of Steel halfway down the screen and slightly behind the airship. This is the best position for reaching bombs. When one is dropped, if you can't punch it, block it with your body. You won't receive credit for a detonation, but you'll protect the city from the explosion.

C) All of Superman's defensive weapons are located at the top of the tunnel, so when traversing the passage, hug the ceiling. Initially, slow Darkseid down with a series of magnetic curtains. Then, when you have opened some distance, drop the destructive radioactive rocks.

D) This challenge is a test of patience. It doesn't matter how many fire balls elude you, as long as you aren't scorched by their contact. Position yourself directly in front of the cannon of your choice. Simply wait for a projectile to be launched, and then quickly push it back down the barrel. In this fashion, eliminate the cannons one by one, until you have Darkseid at your mercy.

E) Your most bothersome problem in this contest is not Darkseid's Kryptonite launcher, but the moving tunnel walls. To avoid being pushed into a rising blast, stay as close to the sliding panels as possible. Not only will you be able to better navigate the tunnel, but you will also have a better chance of timing your offensive shots. C

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REVIEWED BY RICK TEVERBAUGH

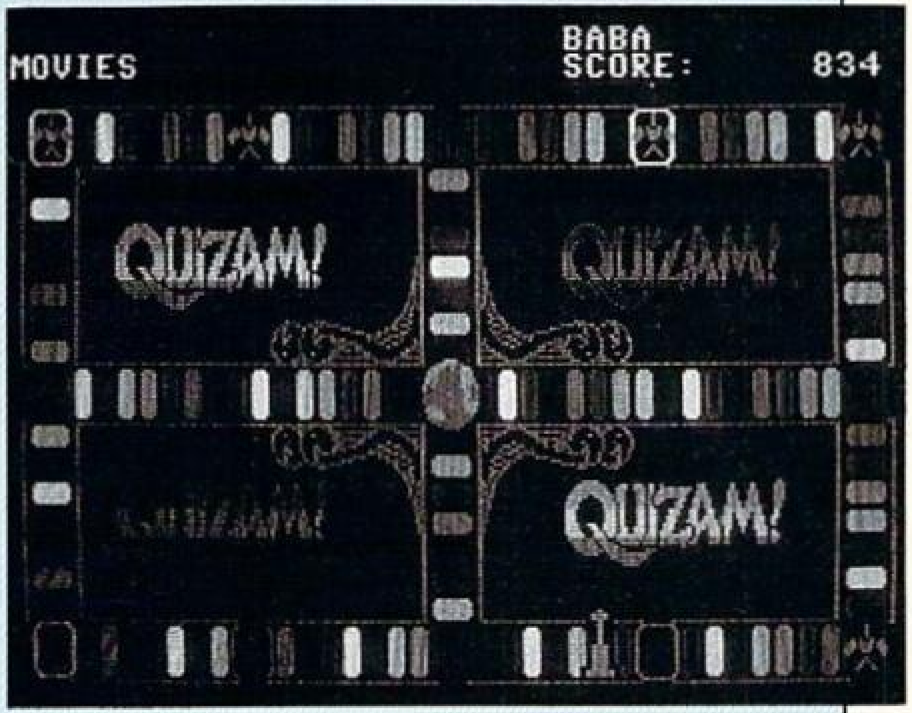
Quizam

Computer: Commodore 64
Publisher: Cygnus
P.O. Box 57825
Webster, TX 77598
Medium: Disk
Price: $29.95
Additional question disks $8.95

I'll be the first to admit that the trivia craze has worn a bit thin. So why review another trivia game? Well, *Quizam* turns out to be one of the finest trivia games I've played.

In *Quizam*, you must retrieve eight satellites that are orbiting the earth. Each satellite represents one category, and each time you reach that satellite on the board, you must correctly answer a multiple-choice question to pick it up. A random question answered correctly then deposits the satellite. An incorrect answer at the drop-off point could release the satellite and force you to recapture it.

In Quizam, *you must retrieve eight satellites that are orbiting the earth by correctly answering trivia questions.*



There are three disk sides that come with the game. Two sides of the disks, called Fun Facts, contain categories like 15-Minute Celebrities, Sports and Games, Popular Culture, Television, Potpourri, Publications, Music and Movies. The other disk, School Days, contains History, Vocabulary, Art, Physical Sciences, Geography, Literature, Music and Life Science as subjects.

Unfortunately, there are only 85 questions per topic (over 20,000 questions total), but you can create your own question disks. You can always turn card sets from other trivia games into question disks, but since most such sets aren't multiple choice, be prepared to come up with some incorrect answers. Teachers can also use *Quizam* for classes, or you can create questions about your relatives for a different twist to that next family get-together.

All questions are answered using a joystick. Since the game keeps track of up to eight players, it can be tedious passing the joystick around. But this inconvenience is slight in comparison to eight people huddled around a keyboard.

There are eight difficulty levels in *Quizam*. The higher the level, the less time there is to answer. There are also eight different game boards from which to choose. Each successive board makes it more difficult to capture the satellites.

There is no luck involved in *Quizam*, a fact that places it several levels above most of the competition. The number of spaces you move on the board doesn't depend on a roll of the dice. Rather, it depends on how much time is left when you correctly answer a question. If you correctly pick the answer immediately, you get to move ahead. It is a good idea to calculate exactly how many spaces you'd like to move on your next turn, so if you get a question you immediately know the answer to, you can follow the timer bar and push the joystick button only when it reaches the right number.

If you guess wrong, an obnoxious noise signals your mistake. Beyond being distasteful, the sound fills the room, making a second guess impossible. Guess early if you don't know the answer, so you can get a second chance before time runs out. With only four possible answers, good guessing becomes a critical part of success in *Quizam*.

Watch picking up more than one orb at a time. Since a wrong answer can send captured satellites back into orbit, try to deposit them as quickly as possible. Don't pick one up in a subject for which you are strong, but then let it get away while trying to pick up a satellite for a weaker topic.

The music and sound effects for *Quizam* are appropriate and lend a game-show atmosphere. The game boards are colorfully drawn, though it is sometimes difficult to tell exactly on which of two squares your pawn is resting.

The documentation is solid, and all features of the game are covered in detail. There are hints for strategy and suggestions for creating good question disks.

Quizam is a game of momentum. Never count a player out. A solid run of correctly-answered questions can bring a player from last place to first place very quickly. Questions on the disk won't repeat until all 85 have been shown, but if you're playing with a large group (four or more), try to have a second disk on hand.

I hope you still have room in your heart to give one more trivia game a chance. *Quizam* deserves it.

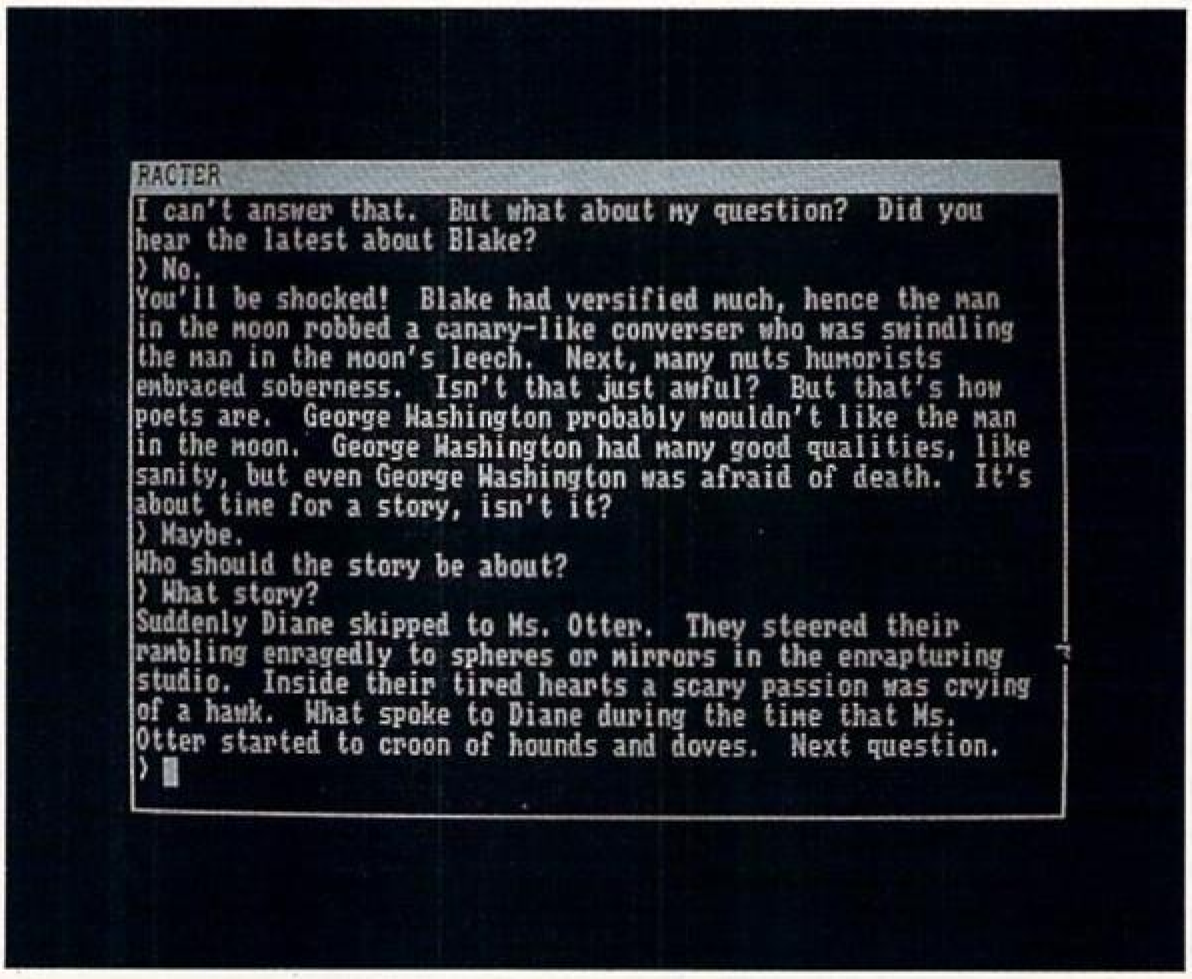
REVIEWED BY ERVIN BOBO

Racter

Computer: Amiga
Publisher: Mindscape
3444 Dundee Road
Northbrook, IL 60062
Medium: Disk
Price: $44.95

Who is *Racter*? No one seems to know. If I were to define his pedigree by his parentage, as is done with racehorses, I might say he is out of Eliza by the Mad Hatter. A coat of arms for *Racter* would probably show a bar sinister with an aphorism rampant. Whoever he is, once you've talked to him, you may never look at life in quite the same way.

As you begin your session, I urge you to configure the disk to make a transcript. I urge you to do this because no one who is not present will believe anything you tell them. After *Racter*, the transcript may be your only link with credibility.



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I can't answer that.  But what about my question?  Did you
hear the latest about Blake?
> No.
You'll be shocked!  Blake had versified much, hence the man
in the moon robbed a canary-like converser who was swindling
the man in the moon's leech.  Next, many nuts humorists
embraced soberness.  Isn't that just awful?  But that's how
poets are.  George Washington probably wouldn't like the man
in the moon.  George Washington had many good qualities, like
sanity, but even George Washington was afraid of death.  It's
about time for a story, isn't it?
> Maybe.
Who should the story be about?
> What story?
Suddenly Diane skipped to Ms. Otter.  They steered their
rambling enragedly to spheres or mirrors in the enrapturing
studio.  Inside their tired hearts a scary passion was crying
of a hawk.  What spoke to Diane during the time that Ms.
Otter started to croon of hounds and doves.  Next question.
> █
```

Racter will now interview you. It doesn't matter that you thought it would be the other way around. He will not be denied his idiosyncrasies, and he is, in spite of a somewhat monotone delivery, insistent. Yes, *Racter* speaks. The text of his replies appears on the screen seconds before his voice is heard, giving the feeling that he is more than happy to elucidate for those of us who cannot read.

"Shakespeare had versified much, so naturally silliness is what all poets try when they cut off the ears of larks."

And it is well that *Racter* speaks (and coughs and sneezes and laughs), for above all, he reminds us that the art of conversation may be brought back to life, and that computing adults, in the privacy of their homes, may still dwell on eternal verities, as well as shoes and ships and sealing wax and cabbages and kings. Actually, *Racter* mentions lettuce and tomatoes more often than cabbage, but he would be the first to tell you that that is neither here nor there.

As *Eliza* was an early computer program that simulates artificial intelligence, so *Racter* is a program that simulates artificial insanity. Yet insanity does not rule out intelligence nor wisdom.

> *If I were to define his pedigree by his parentage, I might say Racter is out of Eliza by the Mad Hatter.*

"Would you say Aristotle was wise? Goofy wouldn't."

Direct questions as to *Racter*'s past are sometimes answered, sometimes not. One time he may tell you he lives in the great void, and another time he will claim the funny farm is his home. But then, perhaps they are one and the same. His age may be guessed as very old, due to references he drops in the course of a conversation.

"Are you industrious, Erv?"

No.

"Immanuel Kant said you were industrious, so there."

Then again, perhaps who *Racter* is is not as important as what he does. He will, for example, remember you from one session to the next and the last topic of conversation. Like any good conversationalist, he has a wealth of anecdotes and uses them freely. His knowledge is encyclopedic. At times he may ask if you would like to hear a story, then ask you who the story is to be about. The yarn is spun and while it may not agree with what you thought you knew, it is always interesting. And as in everything *Racter* says, there are those rare nuggets of insight and illumination.

"If marriage occurred to an imbecile, he might think it was imbecility."

While the ranging and raving style of *Racter* reminds us of Jack Kerouac and Lewis Carroll, the content reminds us of Kant, Plato and Jane Fonda.

Lest you think that chatting with an insane personage is unproductive or, worse, a waste of time, let me leave you with this thought: Who (or what) was really at the other end of the line the last time you used your modem? And can you prove it?

"It has been said that the human doesn't see things as they are, but as he is."

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All software is for the C-64/128. All software is disk only.

REVIEWED BY JACK EMBERLY

MECC Home Software Library

Computer: Commodore 64
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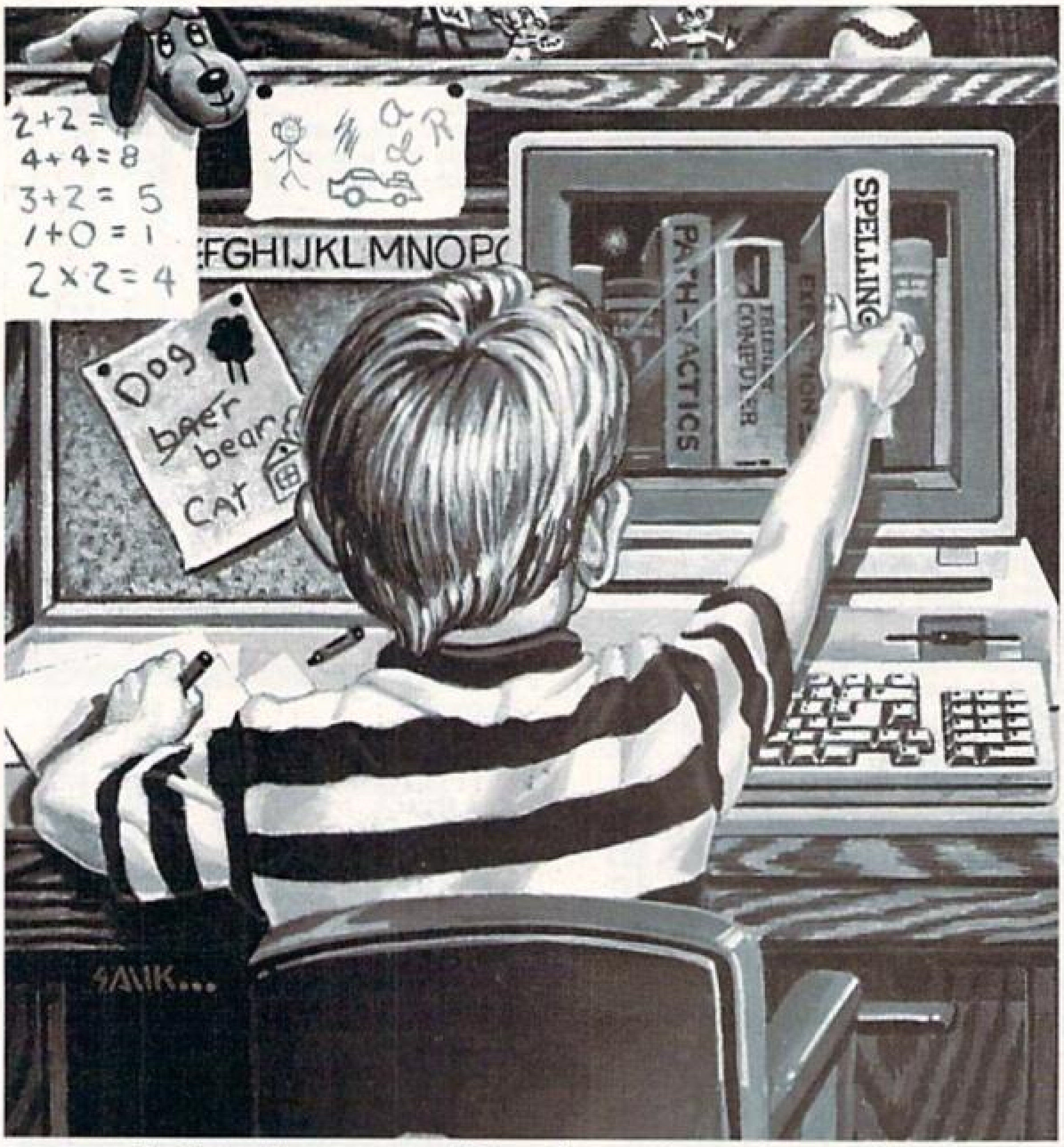

The Minnesota Educational Computing Corporation (MECC) has long been a respected source of software for schools. So Commodore users will be pleased to know that MECC has now released a series of educational programs for the Commodore home market. The six programs in the *Home Software Library* cover reading, math, and social studies for children aged 3 to 15.

The Friendly Computer (ages 5-8)

This five-part program helps children identify major parts of a computer system, quickly locate and use keys on the keyboard, type short words, and save and access information.

Part one, Keyboard, displays the 64 keyboard and asks students to locate letter, number and character keys. Graphics, animation, and sound make the tutorial interesting and enjoyable. Throughout the game, a spritely Wise Owl applauds each successful effort. Part two, Term Worm, shows five parts of the computer system, explains their function, then tests recall with a quiz. Children learn to identify disks, the disk drive, the monitor, the computer and the keyboard.

Part three, Zebug, is a key-locating game. Press the key for a letter or number that is moving across the screen before it collides with a bug running in the opposite direction. Zebug has three difficulty levels that test eye-hand coordination. Level one has individual letters, and the hardest level has whole words. All responses convert to scores which are recorded in the Zebug Hall of Fame.

Part four, Pictures, is a drawing program that introduces some of the graphic capabilities of a computer. Children create their own pictures using single keystroke commands. Part five, Picture Show, allows recall of any pictures drawn and saved during part four. These pictures can be printed with the VIC-1515 or VIC-1525 printers. For letter identification, computer awareness, and motor coordination, *The Friendly Computer* is a good choice.

Pre-Reading (ages 3-7)

This is one of my favorites for teaching the alphabet and consonants. Kindergarten and grade-one children will enjoy the sound and animated graphics.

In part one, Caterpillar, the segments of a colorful caterpillar connect as children find letters to insert within a partial alphabet presented on the screen. Pressing a wrong key causes the whole alphabet to be displayed. Part two, Train, repeats part one but replaces the caterpillar with the engine and cars of a train that whistles and chugs along a track. This was a real hit with my grade-one friends.

Part three, First Letters, displays animals and objects and asks the child to select the first letter of the words. For example, the child sees a dog and presses either G, D, O or R. This is an excellent beginning phonics activity. Part four, Pictures, is a challenging visual memory game. Behind 20 boxes inscribed with letters A through T, sit ten randomly located pictures. The challenge is to match the pairs by remembering locations of each uncovered object. For example, if you find that the V square conceals a house, you must remember this until you discover the other house behind some other square. Concentration is the key.

In parts five and six, the words and shapes repeat the memory game, but test word and shape recall instead of pictures. Words like "green" and "little" are matched to reinforce spelling

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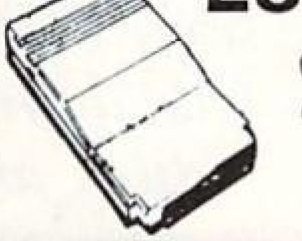

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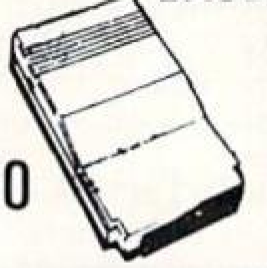

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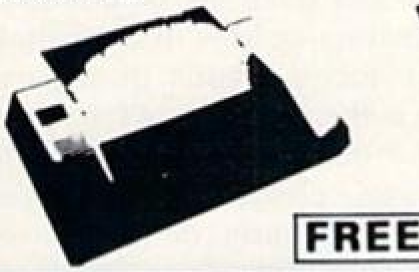

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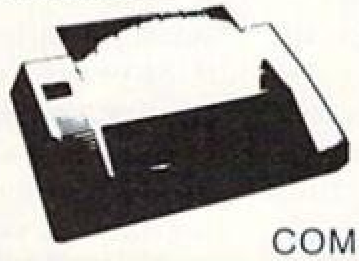

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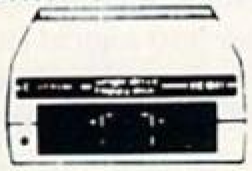

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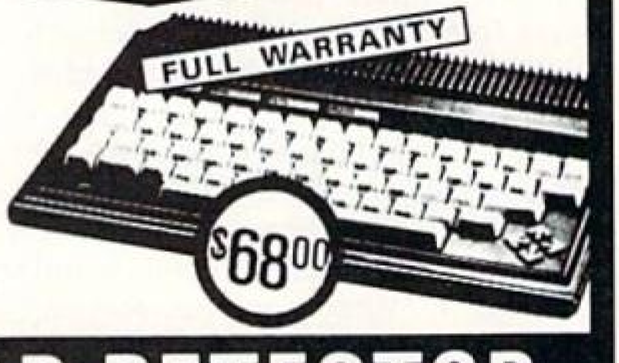

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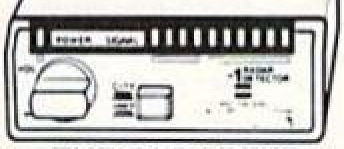

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at the primary level. A management option allows you to replace these words with any of seven letters or less. This option allows the practice of troublesome words or a weekly spelling list. Even without changes, Pre-Reading will be instructional at the primary level and a challenging review for many older children.

Path Tactics (ages 5-12)

In this program, animated robots move strategically along the squares of a game board as players test their addition, subtraction, multiplication and division skills. The object is to reach the end of the board before your opponent, thereby earning the title Path Master. Success depends not only on your math skill, but on your ability to use strategy. Landing on your opponent moves him backward.

Path Tactics has seven levels of play. Procedures for playing the game are the same at each level. Although this program doesn't teach basic math, it does review and practice it.

Spelling Bee (ages 8-13)

This two-part program gets top marks from my grade-two students. I like its vocabulary review for grades one through three.

Part one, Spelling Bee, presents 20 numbered drills. Each drill tests the spelling of 20 common words. On-screen is an incomplete sentence and a choice of three spellings for the word that completes the sentence. Choose the correct spelling before a fat, buzzing bee flies from the left of your screen to a tantalizing flower on the right. The bee stops flying as soon as you answer or when it reaches the flower, whichever comes first.

You may wor[illegible] your own speed or add time limits. For my students, the greater the restraints of time, the more they enjoyed it. They are now eagerly working their way through all 20 drills.

Part two, Bee Editor, should please teachers. This is the same as the Spelling Bee program, but you can change any of the words and sentences. This lets the intermediate teacher provide any vocabulary, from spelling to science.

Expeditions (ages 10-15)

Step back in time to the unexplored North American wilderness to test your survival skills against wild animals, hostile natives, and other lurking perils. You are a 17th-century fur trader whose mission is to retrieve precious mink and fox skins from the rugged routes of the Hudson's Bay Company. Or you may brave the Oregon Trail of 1847, a 2,000-mile journey from Independence, Missouri, to Oregon City, Oregon. Your possessions and life depend on your marksmanship, and your ability to make wise practical decisions.

> *In* Expeditions, *youngsters test their survival skills against wild animals, hostile natives, and other lurking perils.*

Expeditions presents three historic journeys. In voyage one, Furs, you are an Ottawa Indian who leads a fur-trading mission to forts on the Hudson River, the St. Lawrence River, or Hudson Bay. You take with you 1,000 furs, 20 canoes and a crew of 40. As leader, you must react wisely to attacks from hostile natives, storms that can swamp your canoes, and rapids that could drown your crew and end the expedition. Your prosperity and survival depend on the quality of decisions you make.

In voyage two, Voyageur, you take tobacco, guns, and beads from Grand Portage on Lake Superior to Fort St. Pierre on Rainy Lake to exchange for furs, if you survive the treacherous trip. Bad weather, damaged canoes, and unhappy crew members conspire to sabotage you.

In trip three, Oregon, you head a family of five with $700, a wagon, and a dream of reaching Oregon City in five or six months. You must purchase oxen, food, ammunition, clothing and miscellaneous supplies, and how much you spend on each may haunt you later.

My intermediate students loved role-playing pioneers of days gone by. The biggest thrills were the hunting excursions. Even more exciting is the brainstorming and decision-making necessary when the game is played by partners. Youngsters learn that the sharing of ideas is as important to success as it was to the travelers of the Oregon Trail.

Adventures with Fractions (ages 10-14)

Ask kids to name the hardest part of grade-six math and they'll say fractions. Even the most competent students will occasionally forget how to find equal fractions or common denominators, or how to cross-multiply.

The focus of this three-part program is the ordering of fractions with un-like denominators. In Comparing Fractions, children rewrite fractions with a common denominator and then order them. Cross Products presents a shortcut method for ordering two fractions using cross-multiplication. The third program, Ransom, is an exciting game that tests the concepts taught in the first two programs.

Comparing Fractions enhances a student's understanding of equal fractions using a slow and logical step-by-step approach. Each step is abundantly practiced and tested before the next is introduced. Graphics are used extensively. Colorful bar graphs accent the differences between thirds, halves, and quarters. The computer's unique capabilities are creatively used when bars representing fractions superimpose themselves to illustrate size. Only after the student has seen and experienced equal fractions and common denominators is he or she introduced to the shortcuts in Cross Products.

Ransom, the last program on this disk, is a clever device for practicing skills taught in the first two programs. Students become champions who must compare fractions to rescue a kidnapped prince. The child must find the largest of three fractions appearing on three doors concealing good or bad monsters. Correct answers bring forth good monsters who deliver coins to help pay the ransom needed to free the prince. Success brings wealth and fame.

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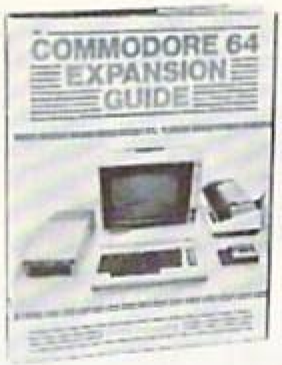

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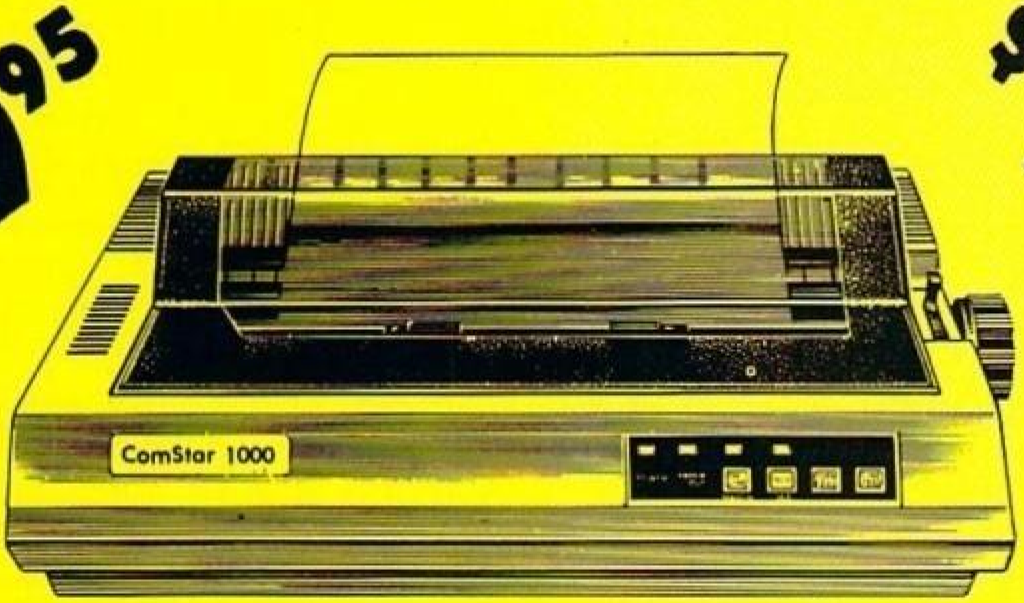

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REVIEWED BY GARY V. FIELDS

Vorpal Utility Kit

Computer: Commodore 64
Publisher: Epyx
1043 Kiel Court
Sunnyvale, CA 94089
Medium: Disk
Price: $29.95

Epyx's *Vorpal Utility Kit* is a collection of disk aids for the 1541 disk drive. It makes chores like copying unprotected programs, recovering scratched files, checking the drive's head alignment, and creating autoloading programs effortless. There is also a command to align a misaligned head.

Vorpal's most impressive feature is its speed. But speed, of course, is relative. If you compare the speed of a 1541 disk drive with that of a 1530 datassette (cassette recorder), you are comparing a rabbit with a turtle. And if you compare the 1541 drive with the 1571 drive, you are comparing a rabbit with a cheetah. But believe it or not, *Vorpal* can make the 1541 rabbit run faster than a 1571 cheetah. To be specific, adding *Vorpal* files to your 1541's diet can increase its speed as much as 25 times.

In late 1982 (before the 1541 was on the market), I used a datassette. One of my favorite programs took so long to load that I could start the load, eat lunch, and still have to wait for the load to finish. When I got a 1541 drive, this program was the first I moved to disk. It took 100 blocks on a disk and loaded in 62 seconds. Later I added Epyx's *Fast Load* cartridge and reduced the load time to 19 seconds. I couldn't imagine faster loading until I used the 1571 drive (using a Commodore 128), which trimmed another five seconds from the load time. But loading the same program on a 1541 drive using *Vorpal* takes only five seconds. Let me repeat that so you don't think you're reading a typo: A 1541 disk drive using *Vorpal* files can load a 100-block file in five seconds.

However, there is a catch—*Vorpal* will fast-load *Vorpal* files only. If you list the directory of a disk, you normally see file types like PRG, SEQ, REL, and USR. But *Vorpal* introduces an entirely new type of file, shown on the directory as SR?. To use *Vorpal's* speed, you must convert your unprotected programs to these SR? files. Fortunately, this is easy.

There are two ways to create SR? files: Save the file normally, but prefix the filename with V: (for example, SAVE"V:FILENAME",8), or use *Vorpal's* Copy/Convert option to convert existing programs to SR? files. I converted an entire disk in less than five minutes using two drives. The copy option will work with only one drive, but takes longer since you have to switch disks.

Although *Vorpal* creates and uses special files to gain speed, all its utility programs will work with normal DOS-created files as well. So, although *Vorpal's* format command will NEW a disk in only ten seconds (about 15 times faster than the straight BASIC NEW command), the formatted disk is completely compatible with all file types. This is true of all *Vorpal's* utility programs that affect files.

Creating a *Vorpal* version of a file does not change the original file, so if your disk has room, you can store both versions of the same program on the same disk. You can also copy a self-booting loader program on each disk, so you don't have to load *Vorpal* from the program disk each time you want to use SR? files.

An SR? file can be listed and edited just like any other DOS-created file. But after using a fast *Vorpal* file once, you'll discover just how addictive speed can be. I'm sure I will never load another regular PRG file again if a *Vorpal* version is available.

One small compromise is necessary to convert normal files to *Vorpal* files: the SR? file requires a few more blocks on a disk, and in some cases, the disk cannot hold as many SR? files as it can normal files. The reason for this is that SR? files are stored on the disk sequentially (one sector after the other), instead of being scattered. This helps decrease the load time because the drive head doesn't have to hunt for file links. I personally found this space sacrifice well worth it.

Normally I'm a skeptic when it comes to utility kits. I use them once or twice and then let them collect dust. But *Vorpal* is an exception for three reasons: speed, ease of use and usefulness.

Because *Vorpal's* options are activated by menu selection, the program is easy to use by novices as well as experienced computer owners. On-screen prompts take the user step by

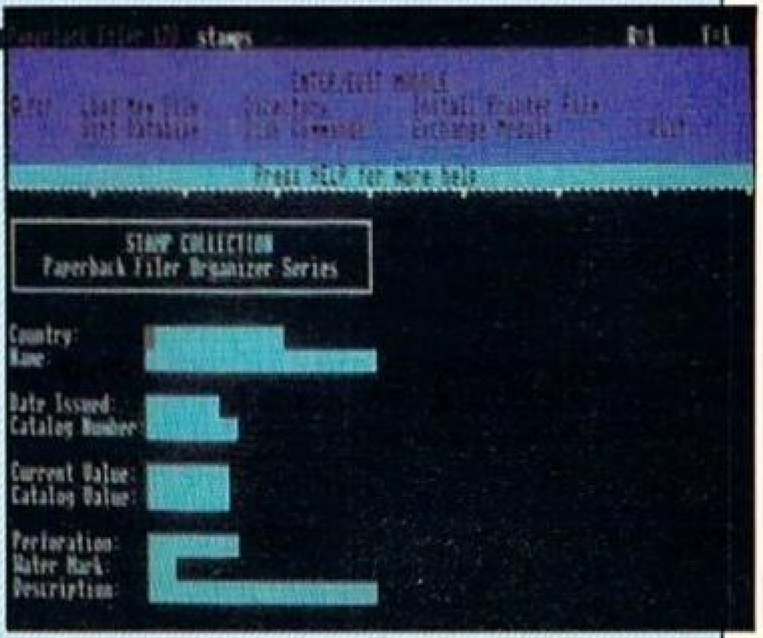
Continued on pg. 173

REVIEWED BY GARY V. FIELDS

Pocket Filer 128

Computer: Commodore 128
Publisher: Digital Solutions
30 Wertheim Court Unit 2
Richmond Hill, Ontario
L4B 1B9 Canada
Medium: Disk
Price: $49.95

Data created or stored by Pocket Filer *is compatible with* Pocket Writer *and* Pocket Planner, *two other products by Digital Solutions.*



Pocket Filer 128 is a potent, flexible data base for the Commodore 128. It takes advantage of the 128's special keys, expanded memory and 80-column display. This is the third of a trio of integrated software programs released by Digital Solutions. Because all three (*Pocket Writer, Pocket Planner* and *Pocket Filer*) were designed by the same programmers, the command structures are similar, and files produced by one are compatible with the other.

This review describes *Pocket Filer* on the Commodore 128 in 128 mode with 80-column display. All of the features mentioned here are available on the 64 version as well, except that special keys, such as ESC, TAB and HELP are assigned to other keys.

The best word to describe *Pocket Filer* is "flexible." Unlike other data bases, *Pocket Filer* allows you to change or move fields within the file without having to rekey the records. This means that if you create a file and use it, then decide you need to change the file's structure (add/delete fields), you can easily do just that.

The flexibility of assigning, changing and defining password privileges will interest users who must allow several employees access to their data. Different clearance grades can be assigned by use of the program's password options. Thus, some employees can be assigned complete access to the data (meaning they can do everything—view files, add data, change layouts, delete records, change reports, and print data), while others can be restricted to simply adding or viewing files. Clearance grades as well as passwords can be changed by the holder of the master password. If there is no need to protect access to the files, all passwords can be removed.

The program is divided into four modules: Create, Enter/Edit, Report and File Utilities. Each is activated by pressing a function key. For example, to lay out the screen display of a file, select the Create module by pressing F1. Now you can design the appearance of the file and define its size, number of fields and the options each record will support.

Each record can contain up to 255 fields. (A field is a single item of information such as a person's name, address or city. A record is a collection of one or more related fields.) Each layout can be up to 160 screen lines in length and each line can contain up to 160 characters. Users of wide-carriage printers will benefit from this ultra-wide screen format. (A single record can contain a maximum of 2,000 characters.)

After you have established a field, it can be formatted to accept selective data such as alphanumeric, numeric, logical, date or time. This formatting helps the user avoid entering erroneous data, like putting an invoice number where the client's name is supposed to go. Each field's data can be aligned right or left, which forces uniform, professional appearance of data.

Fields can be defined as "required" to prevent the user from forgetting to enter vital data, such as an account number or address change. The program will automatically convert selected fields to all upper-case or all lower-case type. This makes searches for exact data easier and faster since the format is always uniform.

Finally, to make editing your efforts easier, the Create module includes options to define sections of the layout as a range, which you can either move, copy, or delete just as you would with a word processor. Using the same range function, the user can surround certain areas in the layout area with a highlight box. In fact, the editing options here are so similar to those of a word processor that this module could be compared to a word processor.

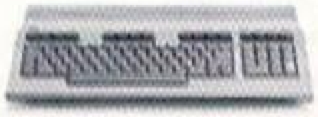
The Enter/Edit module lets you enter or change data. Editing tools let you enter, duplicate, delete, search, sort, or dump data to a printer. Moving between fields is fairly straightforward. One of the nice features is the ability to insert or delete specific characters in a field without having to overwrite the previous entry.

Another welcome feature is the Restore Data option, which allows you to resurrect the original information in a field even after you've overwritten it. This is a godsend when you realize you have accidentally changed something like an account number. To recall the original number, all you have to do is press the RESTORE key.

After you have created a layout and filled in your data file, you are ready to put the data to work. With the Report module, you can create various layouts for each file. For instance, if you have a file containing all your

Continued on pg. 170

HOW TO
TO A HIGHER



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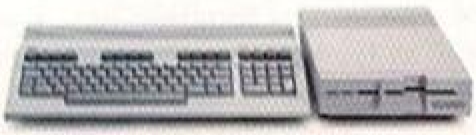

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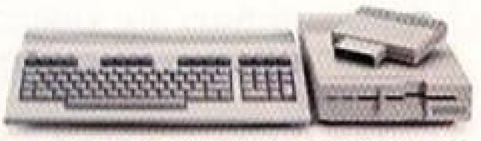

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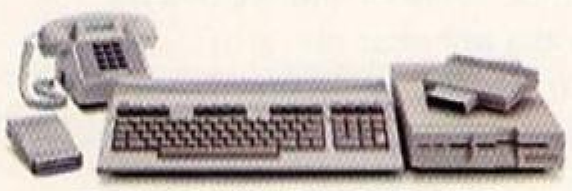

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THE COMMODORE 128 LEARNS TO WRITE.

Looking good in print could be your next move with the MPS 1000 Printer. It's a new dot matrix printer designed to make the most of the 128's high-resolution graphics because sometimes pictures speak louder than words. But it's no slouch when it comes to words. The MPS turns out about 1200 words a minute (100 cps) of draft-quality printing, or gives you near-letter-quality printing at nearly 240 words a minute (20 cps). And you can choose printing styles, use international characters, even make up your own symbols.

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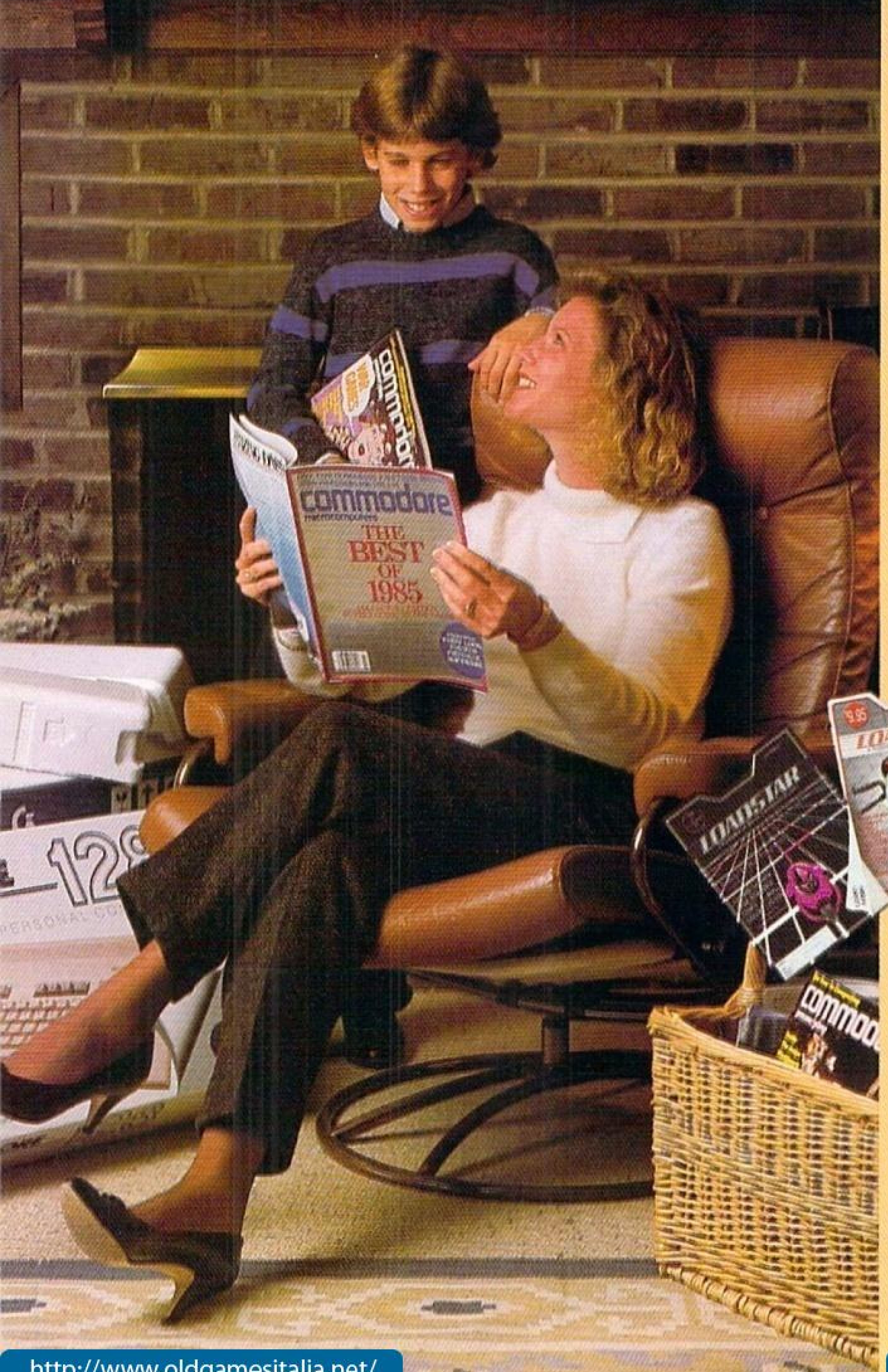

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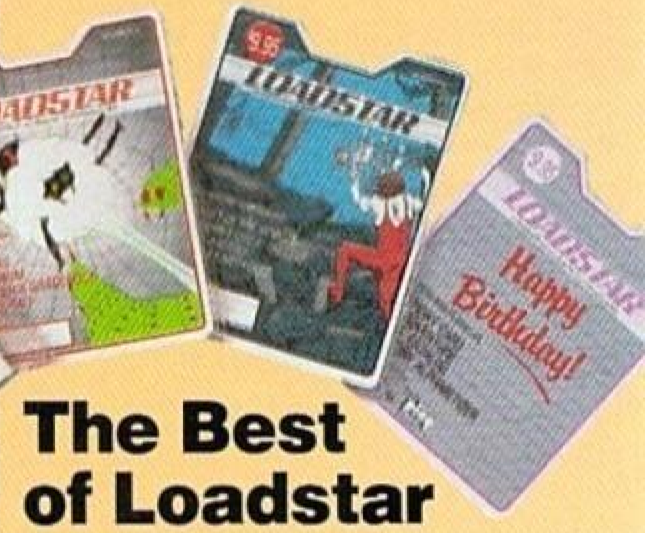

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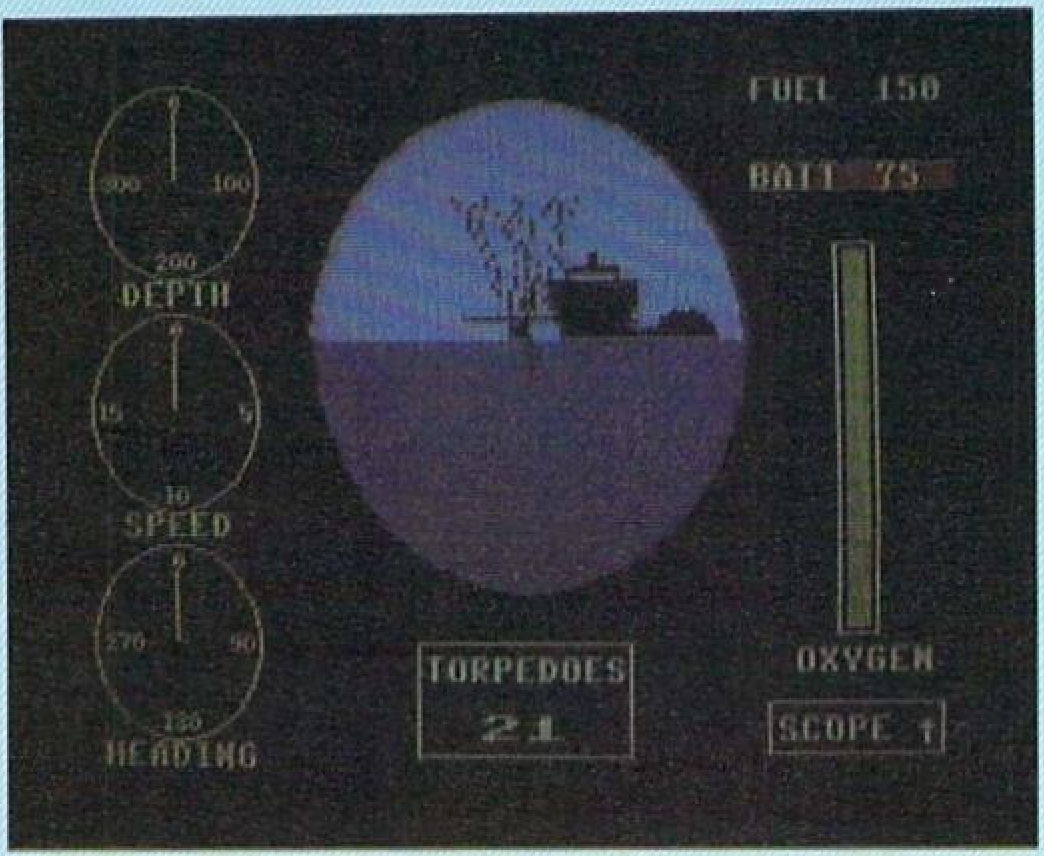
REVIEWED BY JEFFREY HERSK

Gato

Computer: Commodore 64
Publisher: Spectrum HoloByte
1050 Walnut, Suite 325
Boulder, CO 80302
Medium: Disk
Price: $29.95

> *In Gato, you are a World War II submarine commander out to destroy the enemy before he destroys you.*



If you have crashed and burned one time too many with flight simulators, you are ready for *Gato,* a World War II submarine simulator from Spectrum HoloByte. In this game, you are in command of a sub whose mission is to search for enemy tankers and destroy them before they destroy you.

From the control screen, you monitor and control your speed, heading, depth, periscope view, and torpedoes. It takes some practice to get the feel of controlling the sub, and since it responds sluggishly to changes in direction and speed, each move must be anticipated well in advance.

Pressing the C key brings you into chart mode. Here you see an aerial view of your position in relation to enemy ships and three islands. If you are a long way from your destination, you have the option of moving immediately to another location by entering its coordinates. This eliminates lengthy, uneventful cruising. Unfortunately, the coordinates are not printed on the chart screen itself, so you must look them up in the instruction manual.

When you spot an enemy ship, it's a good time to take your sub down. Remember, the element of surprise is a sub's strongest asset. Don't forget to switch your engines from diesel to battery power or you may find your sub lifeless on the ocean floor. You also must remember to keep an eye on your oxygen and battery power supply.

The deeper you dive, the harder it is for the enemy to detect you. However, once you dip below 45 feet, you no longer have a view through the periscope. Your main navigational tools then become the chart screen and the radar screen. The radar screen looks just like the real thing and is a very effective means of charting your course while submerged. Both the enemy ships and the islands leave trails on the radar screen, enabling you to judge your course in relation to them. Use your radar sparingly, though, because the enemy is equipped with radar detection.

You have 24 torpedoes, which can be fired from either the forward or aft torpedo tubes. A perfectly aimed torpedo will sometimes fail to do any damage. This is realism carried to the extreme.

While moving into position on an enemy ship, if you hear a rhythmic pinging sound, take heed! This is the enemy's sonar. They have located your sub and will now make an aggressive attempt to destroy it. You will hear the sound of exploding shells and depth charges, and the enemy may also attempt to ram your sub. Flight is highly recommended here.

While involved in a skirmish, it is a good idea to press the D key periodically to access the damage-report screen. Here, you will find a list of the sub's vital areas, with those which have been damaged indicated by a red dot. The G key will present the same information in a graphic format. A cross-section of the sub is shown with damaged areas indicated in red.

Aside from running down and attacking the enemy, the successful sub commander has many strategic and tactical decisions to make. Your chances of survival are always lower if you are attacked while your resources are low, so you may opt to wait for a convoy to pass rather than chasing it at full speed and wasting precious fuel. Or you may decide to slip back to your base to replenish your supplies and repair your sub before tackling another foe.

If you are successful in completing your mission, your accomplishments will be recorded in the ship's log, which can then be saved to disk, should you decide to continue your voyage at a later time.

All in all, I found *Gato* to be a stimulating game. With five skill levels, it should present a challenge to even the most experienced simulator fan. So clear the bridge and prepare to dive. ◼

REVIEWED BY CHRISTINE ADAMEC

Crossword Magic

Computer: Commodore 64
Publisher: Mindscape
3444 Dundee Road
Northbrook, IL 60062
Medium: Disk
Price: $49.95

Did you ever wonder about the people who create crossword puzzles? How do they devise those puzzles with the weird words you've never heard of? Here's your chance to learn how to create crossword puzzles with *Crossword Magic* by Mindscape.

Whether you're a crossword genius who whips through the *New York Times* crossword with a felt-tip pen, or more like the rest of us as we ponderously pencil in the squares, you'll enjoy *Crossword Magic. Crossword Magic* creates easy, medium or hard crosswords. You determine the level by the words you select.

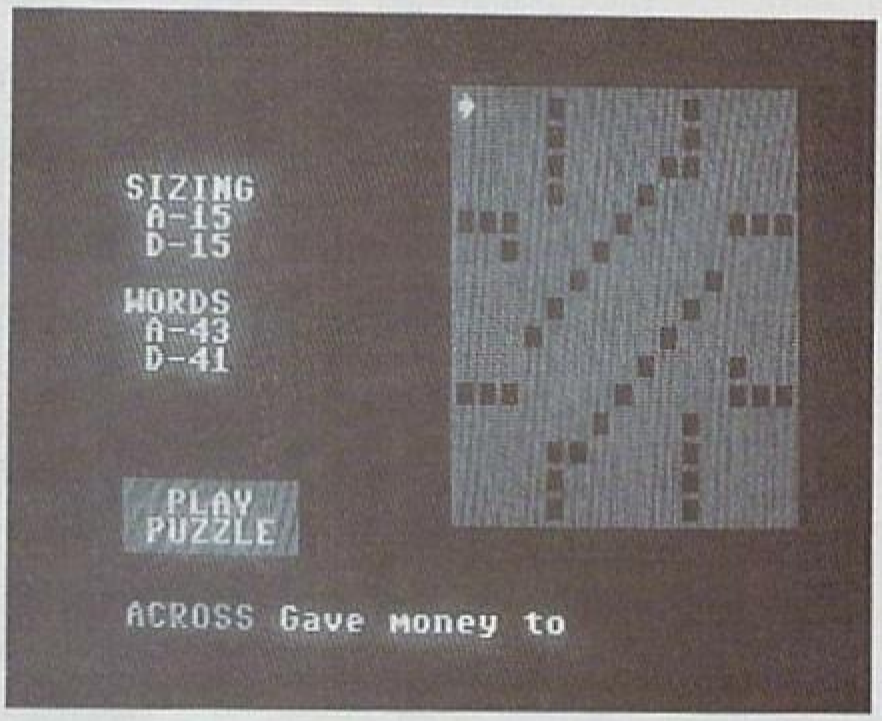
Crossword Magic is menu-driven. Get a good feel for the program by playing the demo crossword, or start right in creating your own puzzle. You can play a puzzle on-screen or print it out.

Your first decision as puzzle-maker is whether you want an "adjustable" puzzle. An adjustable puzzle grows outward as you add on new words. If you select an unadjustable puzzle, you can choose up to 20 boxes down and 20 across—including the blacked-in areas—and you'll see it laid out in front of you.

Either way is fun, but be careful to select enough boxes if you go for the unadjusted puzzle. For example, if you choose eight across and eight down as I did once, you're limited in what words will actually fit in that framework. So make sure to ask for enough boxes if you go for this mode. I suggest 20 by 20, which is the maximum.

The next step seems backward, but that's because you're the crossword creator rather than the solver. Type in the answers to the clues you'll later input and the program will place your words on the screen.

After you've entered all your words, it's time to think up clues. This is the hard part.



```
SIZING
 A-15
 D-15

WORDS
 A-43
 D-41

 PLAY
PUZZLE

ACROSS Gave money to
```

One slick option I liked in this section was that if you choose a word that doesn't fit, the computer automatically saves that word to use later—if and when it does fit.

After you've entered all your words, it's time to think up clues. This is the hard part. You may begin to sympathize with the crossword creators you just denounced, because what a word means to you may have a completely different connotation to someone else. For instance, I needed a definition for the word "hopeful," so my first choice was "there's a chance." This definition completely baffled my husband. Yet in another case, I hit the "right" definition the first time with "great computer or naval officer." He guessed "Commodore" right away!

After you've designed your puzzle, you'll want to save it to a blank disk. *Crossword Magic* formats the disk for you. You can save up to 20 puzzles per disk, copy puzzles to another disk, edit old puzzles, or erase them altogether. You can even play your own crossword.

Crossword Magic is an outstanding program, one I highly recommend to parents and teachers. If your child is already strong in English, he or she will find it challenging; if he or she is weak, it will be an inspiration.

The printout looks professional, complete with blacked-out areas. It prints on 18 of the most common dot-matrix printers on the market, and you can select what you want printed. For example, you may or may not want a listing of all the words in your puzzle. (It may be too tempting if the answers appear with your puzzle, so you can avoid this option.)

And if your printout reveals errors? Editing is easy, and you can save over the old puzzle. I did notice, however, that the computer often placed words differently than where I would have put them, and I had to accept that. But I could move a whole section manually or press CTRL R to have the program find other places for the words.

Crossword Magic is an outstanding program. Use it to entertain yourself and your friends, amuse people at parties, or dazzle your relatives. Make up "themed" crosswords for special occasions. Parents and teachers will find this program extremely valuable, both as a tool for creating crosswords for children, but also for allowing them to use the program themselves to create their own puzzles.

Who knows? Maybe in the not-so-distant future, you or your child will have written that crossword in the newspaper! C

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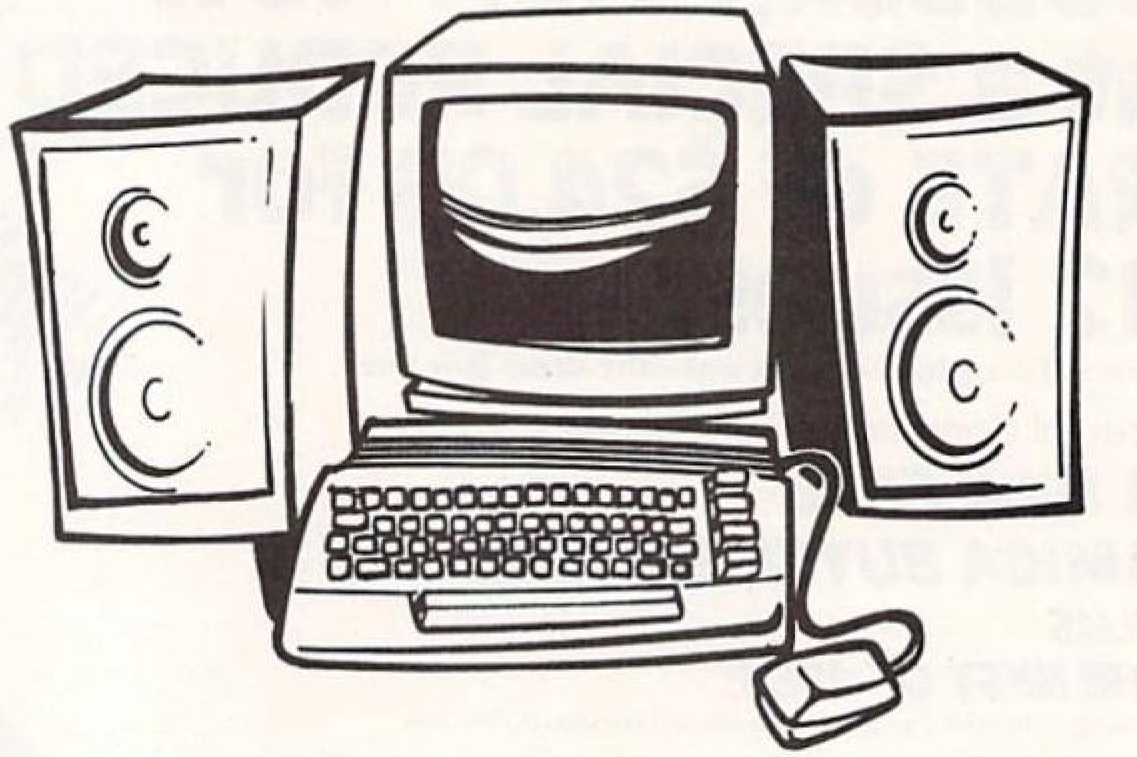
DR886

BY HOWARD MILLMAN

MIDI Magic

From Piano Rolls to Disk

Reaching back across time, MicroFantics, Inc. has pioneered the blending of antiquity and electronics. The result? Turn-of-the-century technology transplanted into the computer age, and available for the Commodore 64 and a keyboard with a MIDI interface.



Last summer my family and I shoehorned ourselves into a 26-foot motorhome and braved, even enjoyed, a 7,000 mile, month-long tour through the Midwest.

We saw a lot of America's memorable past, including many restored Old West saloons and dance halls. And in most of them, usually off in a corner, was a rag-tag player piano. For a quarter or two, I could coax a strident tune from its tired strings, as it briefly remembered its raucous past. And, captivated by this turn-of-the-century technology, I dropped many a quarter down the slots.

Coincidentally, waiting for me when I returned home was a press release from MicroFantics announcing the availability of a series of products titled *MIDI Magic*—vintage player-piano music on floppy disks for the Commodore 64 and keyboard with a MIDI interface. Intrigued by the claims, I accepted an invitation to their Butler, New Jersey, offices for a demonstration.

Sure enough, there stood a venerable old player piano against the wall. Only this one was surrounded, not by tourists, but by state-of-the-art electronics. A glance into its interior revealed an anatomy comprised of wheels, gears, bellows—and digital pickups wired into a microprocessor. Knowing how rare microprocessors were back in the 1920's, I asked if this were the world's first bionic piano.

"Not quite," replied Lou Ploch, MicroFantics' marketing director. He explained that the original mechanical components are necessary for playing the rolls. The electronics were added to translate that mechanical motion into computer-digestible digital data. From there it's written onto a program disk.

Although it may not be immediately apparent, there is a real connection between these two technologies. Piano rolls are, if you think about it, one version of the earliest forms of digital data storage. There was a time when punched tape and cards were THE storage medium, before magnetic media were introduced.

Each of those disks plays for about 15 to 20 minutes, and contains a medley of six instrumentals grouped by listening type. Every variety of music is available including classical, country and western, popular, rhythm and blues, jazz, and others. There are presently 1,000 selections available and another 10,000 waiting in the wings to be transcribed.

Every selection is transcribed from original player-piano rolls. In fact, some of the rolls were made by the masters themselves. George Gershwin and Scott Joplin, for instance, actually cut the original rolls for some of the selections, so you are hearing more than just their music—you are hearing *them*. The disks include not only the old masters, but also contemporaries like Elvis, Billy Joel and even Michael Jackson.

The "Magic" of the MIDI

Technically, computer disks contain no music—just digitally encoded data. To hear the music you need a device, like an electronic keyboard, equipped with a Musical Instrument Digital Interface. This is simply a DIN input somewhere on the keyboard that contains the requisite internal electronics to faithfully transform the incoming digital signals into music.

The quality of that music can be excellent—in fact, absolute—depending on your choice of keyboard and speakers. As with laser audio disks, there's no contact with the surface of a computer disk, so scratchy static or hiss isn't transmitted. That's difficult to achieve by any other means when you're working with these old-time piano rolls.

Depending on your keyboard's versatility, you can also alter the music. Do you want the playback to sound like drums, horns, guitar? Whispered *pianissimo* or bellowed *con brio*? Or why not play along with voice-over? The variations for playback are wide, depending, once again, on the sophistication of your keyboard.

Regardless of the complexity of your MIDI keyboard, the *MIDI Magic* software itself is simple to use. There is a minimum of computer commands—just three. F1 increases the tempo, F3 slows it, and the space bar is the cause for pause. The six selections can be played individually or chained to play consecutively.

One beguiling element of the otherwise straightforward software is the entrancing graphic display. As the selection plays, colorful notes splash across the screen. Besides being helpful to sing-along types, it's relaxing to watch—in fact, almost hypnotic.

MicroFantics is also distributing "Teach Yourself" manuals with some of the same selections that are on the disks. That way, you can play along, at your own pace, while following the notes on the screen or in the manual. Now, in a sense, you always have someone to play with.

Well, it's time to power down *Word Writer,* boot *MIDI Magic* and let Billy Joel's music flood the room with, naturally, "Piano Man."

And, while I'm listening, I'll reflect on another of life's bitter ironies: If only I knew last summer what I know now—think of all the quarters I could have saved.

MIDI Magic, MicroFantics, Inc., Butler, New Jersey 07405, 201-838-9027. MIDI Interface with demo disk: $49.95 Program disks: $19.95 each. Available by mail or at computer and music shops. ▣

Putting the MIDI into *MIDI Magic*

The demonstration I saw at MicroFantics used a Casio CZ-101 keyboard. But, in case you haven't realized it yet, it's the MIDI you need, not necessarily the keyboard. One alternate device, for instance, is a MIDI synthesized box that contains (naturally) just the MIDI. These boxes also contain other features to electronically alter and enhance the music.

Enjoying this technology is still, however, somewhat expensive. Although MicroFantics' MIDI cable interface (plus one demo disk) is only $49.95, the MIDI-equipped keyboards or synthesizers can be costly. But their cost is declining as their popularity increases: In the past year alone, prices have dropped from about $1,000 to less than $300. Shop wisely, and you may find one for less than $200. ▣

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BY LOUIS F. SANDER

Hints for Fun and Utility

This month marks the beginning of a new department in Commodore's magazines. Every month, we'll bring you a super collection of computer hints from readers all over the world. Each month in this column, no matter what your area of interest or level of expertise, you'll find something to make your computer life more productive, more interesting or more exciting. To keep the column flowing, we solicit your short programs, useful programming techniques, computer room hints, and similar items of interest, and we pay up to $50 for the items we select. We look for new or recycled material that can be implemented with a minimum of time, effort and theoretical knowledge, and that is of current value to Commodore computerists of every kind. If you have an item that fills the bill, just send it to:

Louis F. Sander
PO Box 101011
Pittsburgh, PA 15237

If you enclose a self-addressed stamped envelope, we'll send you our hint-writer's guide. Readers outside the U.S. may omit the stamp.

Dice machine: If you have played non-computer games, you've undoubtedly encountered those quaint little cubes called "dice." Most such games use two six-sided dice, but some of the *Dungeons and Dragons* games use four-, eight-, ten- and twenty-sided dice, sometimes in quantities other than two.

It's often useful to computerize certain parts of these games, so more time can be spent playing and less spent bookkeeping. The accompanying program will give the results of throwing any number of dice with any number of sides. You can use it as it is, or turn it into a subroutine to use in other programs.

If you use it elsewhere, be sure to keep the X = RND (-TI) step. It's needed to insure that you get a different sequence of numbers each time the program is run.

Tom E. Hyde
Camp Lejeune, North Carolina

```
100 PRINT"[CLEAR,DOWN]";TAB(7);
    "C= DICE MACHINE - TOM HYDE[DOWN]"
    :X=RND(-TI)'FKEH
110 INPUT"[SPACE2]NUMBER OF DICE";
    D'BCDB
120 INPUT" NUMBER OF SIDES";S'BCKC
130 IF D<1 OR S<2 THEN PRINT"[DOWN]
     ???[DOWN]":GOTO 110'HIYF
140 GOSUB 270'BDMA
150 GET A$:IF A$="R"THEN 180'EIQE
160 IF A$="Q"THEN 260'DFAE
170 GOTO 150'BDFD
180 FOR J=1 TO D'DDYF
190 N=INT(RND(1)*S+1)'FIDJ
200 IF S>9 AND N<10 THEN PRINT" ";
     'GGPB
210 PRINT N;:T=T+N:IF J<D THEN
    PRINT"+";'HKPE
220 NEXT'BAEX
230 PRINT"=";T'BCBA
240 T=0:R=R+1:IF R=20 THEN R=0
    :GOSUB 270'IQHJ
250 GOTO 150'BDFC
260 END'BACC
270 PRINT TAB(5);"[DOWN]PRESS [RVS]R
    [RVOFF] TO ROLL, [RVS]Q[RVOFF]
     TO QUIT[DOWN]":RETURN'DEAN
```

Flower power: No flowers to give to your sweetheart? Run this program instead. Its products aren't as fragrant as the real thing, but they do just as well at conveying your sentiments.

Bob & David Snader
Baltimore, Maryland

```
10 PRINT"[CLEAR,SPACE2]
   C= FLOWER POWER - BOB & DAVID
   SNADER":FOR J=1 TO 20:PRINT
   :NEXT'GHOM
20 DIM A(64):V=53248'CMBB
30 FOR L=12288 TO 12799:POKE L,0
   :NEXT'FQEF
40 FOR T=0 TO 29:READ P,B:POKE V+P,B
   :NEXT'HOSH
50 FOR T=0 TO 7:POKE 2040+T,192+T
   :NEXT'HPSI
60 FOR Q=0 TO 63:READ N:A(Q)=N
   :NEXT'GNSI
70 FOR T=0 TO 7:FOR Q=63 TO 0 STEP-1
   :L=L-1:POKE L,A(Q):FOR D=0 TO 40
   :NEXT:NEXT:NEXT'RDLT
80 DATA 000,220,001,140,002,095,003,
   155'BGTK
81 DATA 004,170,005,145,006,120,007,
   140'BGCL
82 DATA 008,195,009,150,010,245,011,
   155'BGRM
83 DATA 012,070,013,145,014,145,015,
   150'BGFN
84 DATA 021,255,028,255,032,015,033,
   015'BGOO
85 DATA 037,005,038,000,039,007,040,
   006'BGJP
86 DATA 041,002,042,007,043,004,044,
   001'BGTQ
87 DATA 045,002,046,001'BPRO
90 DATA 002,128,160,002,162,160,002,
   162'BGDL
91 DATA 160,000,162,128,010,046,040,
   042'BGCM
92 DATA 191,170,042,191,170,010,046,
   040'BGNN
93 DATA 000,166,128,002,166,160,018,
   166'BGWO
```

```
94 DATA 160,018,132,161,020,004,001,
   021'BGTP
95 DATA 004,005,005,068,021,005,068,
   084'BGQQ
96 DATA 001,068,084,000,084,080,000,
   005'BGGR
97 DATA 064,000,004,000,000,004,000,
   000'BGWS
```

Infinite lives: If you have the *Pitfall* game, POKE 5383,258 will give you an infinite number of lives. In *Quest For Tires,* the same thing can be accomplished by

POKE 7341,99 : POKE 11485,125 : POKE 14864,0

Vahan Der Ghazarian
Limassol, Cyprus

Tax tips: If you itemize deductions at tax time, there may be several ways to deduct the cost of your computer equipment, supplies and software purchases. Some of the major ones are discussed below, but needless to say, none are guaranteed to be effective in your case. Your best bet is to consult with a qualified tax expert or attorney.

1. Use in business. Particularly if you are self-employed, using your computer for business purposes will generally produce tax benefits. The cost of your equipment can usually be depreciated, and disks, paper and other supplies can be deducted as business expenses. The one major pitfall is that your computer must be used solely for business purposes. If the IRS discovers that you have been playing *ZAXXON,* you may be out of luck.

2. Use for tax preparation. At least a portion of your computer costs may be deductible if related to tax return preparation or the maintenance of tax records. Commercial tax accounting software is a good example. Also, a data base used primarily to store tax information will likely be allowed as a deduction.

3. Computer-related income. Efforts to generate income by developing commercial software or selling articles to computer magazines may give rise to business-type tax benefits. A major factor is whether you have in fact generated income, even if less than your reported expenses in a given year. Consequently, selling an occasional program, magazine article or computer hint may make a big difference in keeping the tax man at bay. If you can show a profit in two years out of five, your efforts are presumed to be for profit rather than recreation.

Kent M. Bridwell
Los Angeles, California

Jumbles: This program makes puzzles similar to the popular Jumbles you see in the newspapers. Choose a topic and the number of Jumbles you want to produce, then stand back and see them come up on your printer.

The unscrambled words will be printed at the bottom of your sheet. If you don't want them, just delete the W$(J) in line 260.

Bill Sander
Marietta, Ohio

```
100 PRINT"[CLEAR,DOWN]";TAB(8);
    "C= JUMBLES - BILL SANDER"'CEJD
110 INPUT"[DOWN,SPACE6]TOPIC";T$'BDPY
120 INPUT"[DOWN] # OF WORDS";N
    :IF N>25 THEN PRINT"[DOWN]
    25 WORDS MAX!!":GOTO 120'GKIJ
130 DIM B(30),J$(N),L$(30),W$(N)'BYYD
140 FOR J=1 TO 20:B$=B$+CHR$(164)
    :NEXT'HPHG
150 FOR W=1 TO N'DDWC
160 PRINT"[DOWN,SPACE2]WORD #";W;
    :INPUT W$'CGQF
170 L=LEN(W$):W$(W)=W$:FOR K=1 TO L
    :L$(K)=MID$(W$,K,1)
    :IF L$(K)=" "THEN L$(K)="-"'MRKT
180 B(K)=K:NEXT'CGAF
190 FOR K=1 TO L:D=INT(RND(0)*L+1)
    :E=INT(RND(0)*L+1):T=B(D)
    :B(D)=B(E):B(E)=T:NEXT'RSAY
200 FOR K=1 TO L:J$(W)=J$(W)+L$(B(K))
    :NEXT'GXME
210 NEXT'BAEW
220 OPEN 4,4:CMD 4'CFLA
230 PRINT SPC((80-LEN(T$))/2);T$
    :PRINT'GONF
240 PRINT:PRINT:FOR J=1 TO N
    :PRINT SPC(30-LEN(J$(J)));J$(J);"
    [SPACE2]";B$:PRINT:NEXT'LDCN
250 FOR J=1 TO 53-3*N:PRINT:NEXT'HIHH
260 FOR J=1 TO N:PRINT W$(J):NEXT'FKSH
270 PRINT#4:CLOSE 4'CDRE
```

Charge: Here is a very nice sound effect, using two voices to produce the fanfare so often heard at ball games.

Thomas Cechner
Naperville, Illinois

```
10 REM * C= CHARGE! - THOMAS CECHNER
   *'BAFE
15 V=54272:GOSUB 75:POKE V+5,85'EPVH
20 POKE V+6,85:POKE V+12,85
   :POKE V+13,85'GTBG
25 POKE V+24,15:POKE V+4,33
   :POKE V+11,17'GTLK
30 FOR J=1 TO 6'DDKB
35 :READ H1,L1,H2,L2'BMAH
40 :POKE V+1,H1:POKE V,L1'DLSE
45 :POKE V+8,H2:POKE V+7,L2'EMVK
50 :IF H1=50 THEN FOR T=1 TO 200
   :NEXT'HLPH
55 :FOR T=1 TO 100:NEXT'EHBJ
60 NEXT J'BBDC
65 GOSUB 75'BCXH
70 END'BACD
75 FOR J=V TO V+23:POKE J,0:NEXT
```

```
    :RETURN'HLOO
80 DATA 025,030,018,209,033,135,025,
    030'BGJK
85 DATA 042,062,031,165,050,060,037,
    162'BGOP
90 DATA 042,062,031,165,050,060,037,
    162'BGOL
```

Lampman: The fellow in this program has lots of powder at his disposal. Be careful what you wish when he's about.

Robin Bowness
Pompano Beach, Florida

```
10 PRINT"[CLEAR,DOWN,SPACE7]
    C= LAMPMAN - ROBIN BOWNESS"'BACG
15 POKE 53280,0:POKE 53281,0'CPLG
20 FOR S=832 TO 895:POKE S,255:NEXT
    :V=53248'GVRG
25 FOR S=896 TO 1023:READ T:POKE S,T
    :NEXT'GPMK
30 POKE 2040,13:POKE 2041,14
    :POKE 2042,15'DXOF
35 POKE V+39,0:POKE V+40,5
    :POKE V+41,7'GRQL
40 POKE V+21,7:POKE V+28,2
    :POKE V+37,7'GRWH
45 POKE V+38,10:POKE V+3,120
    :POKE V+4,172'GUDN
50 POKE V,150:POKE V+1,120
    :POKE V+2,150'FTCI
55 POKE V+29,4:FOR J=1 TO 20:PRINT
    :NEXT'HMWM
60 POKE V+5,133:FOR D=1 TO 50:NEXT
    :FOR S=895 TO 832 STEP-1:POKE S,0
    :FOR D=1 TO 50:NEXT:NEXT'RHST
61 DATA 001,085,000,005,253,064,007,
    051'BGGJ
62 DATA 064,023,255,080,031,207,208,
    015'BGSK
63 DATA 255,195,043,003,015,043,003,
    138'BGTL
64 DATA 170,206,170,042,170,168,010,
    170'BGQM
65 DATA 160,042,138,160,010,170,160,
    002'BGEN
66 DATA 162,160,002,170,160,000,168,
    160'BGJO
67 DATA 000,170,160,000,042,168,000,
    010'BGQP
68 DATA 168,000,042,168,000,000,010,
    223'BGXQ
69 DATA 000,000,000,000,000,000,000,
    000'BGER
70 DATA 000,000,000,000,000,000,000,
    000'BGEJ
71 DATA 000,000,000,000,000,192,000,
    000'BGQK
72 DATA 224,000,012,048,060,030,028,
    126'BGFL
73 DATA 051,015,255,195,007,255,195,
    007'BGJM
74 DATA 255,195,001,255,102,000,254,
    060'BGON
75 DATA 000,254,024,000,124,000,000,
    056'BGOO
76 DATA 000,001,255,000,007,255,192,
    007'BGFP
```

Telecommunications privacy: Never, never, never use the same password on any two telecommunications systems. Fly-by-night schemes have been occasionally set up to trap the unwary computerist into revealing his secret passwords. By using different passwords for every on-line activity, you'll be safe from these nocturnal aviators. You'll also lessen the chance of revealing your password to innocent but opportunistic strangers.

Mike Dryja
Washington, Michigan

On-line recording: If you subscribe to QuantumLink or another on-line service, you can use your VCR to save time and money. Just connect the VCR to one of your computer's outputs, then make a tape of your on-line activities. If something good moves by too fast, you won't have to wait for it to be retransmitted, because you'll have it saved on tape.

It's easy to connect the VCR to your monitor, if you take the time to understand things. You may also need some cables and adapters from Radio Shack or another electronics store. With the explanation below, plus the manuals from your computer and VCR, finding the right connections should be an easy project.

Your computer has two video outputs—the TV connection from the single-pin RCA connector, and the two video-out connections from the eight-pin DIN connector. The TV connection couples to the antenna of a TV set tuned to channel 3 or 4, while the video-out connections mate with the video-in connections of a video monitor.

Most VCR's have both antenna terminals and video-in connectors, so you can use either one with your computer. The TV connection is probably the easiest, but may not have the clearest picture. The video monitor connection may be clearer, but will only be in black and white. (Commodore has two video output wires, luma and chroma. VCR's have only one video input, which should be connected to the luma output.)

You can use either output for your VCR, regardless of which one is in use at present. To connect two devices to one computer output connector, just use Y-connectors to put them in parallel.

Alicia I. Birch
Clarksville, Tennessee

Easy RUN: Here's a one-touch method for running any program in memory on the C64 or C128. Just hold down the left SHIFT key and press the 2 and 4 keys at the same time. With practice, you can hit all three keys with the fingers of one hand.

Khoi Luu
Tehachapi, California

TIPS AND TRICKS

Deleting program lines: Here's a shortcut to deleting blocks of program lines on the C64. Execute a POKE 774,0 to modify your computer's list routine. The modified routine lists line numbers only, without the accompanying program material. After the POKE, just LIST the lines you want to delete, then press RETURN over each of the numbers.

POKE 774,26 to restore your computer to normal, then LIST your program to verify that the deleted lines are gone.

Robert B. Cook
Braintree, Massachusetts

Disk default: Are you tired of typing ",8" every time you want to use your disk drive? Would you spend five minutes to get permanent relief? If so, type this little program, which changes the default device number from 1 to 8.

Be sure to save it before you use it the first time, since using it erases it!

Pressing STOP/RESTORE will disable the utility, while SYS679 will bring it back to life.

Richard Penn
Montreal, Quebec
Canada

```
10 PRINT"[CLEAR,DOWN,SPACE5]
   C= DISK DEFAULT - RICHARD
   PENN"'BALG
20 FOR J=679 TO 716:READ K:POKE J,K
   :CS=CS+K:NEXT:IF CS<>4119 THEN
   PRINT"BAD DATA":STOP'ODHP
25 PRINT"[DOWN]DELETE LINE 25,
    THEN SAVE THE PROGRAM"'BACN
30 SYS 679:NEW'CEGB
40 DATA 169,002,141,049,003,141,051,
   003'BGJG
50 DATA 169,186,141,048,003,169,197,
   141'BGUH
60 DATA 050,003,096,169,008,133,186,
   169'BGOI
70 DATA 000,133,010,076,165,244,169,
   008'BGVJ
80 DATA 133,186,076,237,245,010'BXYI
```

Disk handling tip: When using programs that require frequent swapping of disks, you never know where to put the disk that's waiting to go into the drive.

I stand it up in the space between the horizontal rows of keys on my computer. On the C128, the horizontal grooves at the rear of the cabinet serve a similar purpose.

Brandon McWhorter
Arlington, Texas

Defeating disk drive damage: If you are transporting your disk drive, you should always insert the cardboard head protector that came with it. But if you don't have the cardboard protector (and who does?), just use a diskette, inserted into the drive sideways. This not only protects the drive head, but also provides a safe and convenient place to store a disk.

Brian Slack
Menlo Park, California

1571 quirks: The 1571 disk drive is a double-sided drive, and is therefore capable of formatting disks with 1,328 blocks free. This compares favorably with the 1541 drive, of course, which can put only 644 blocks on one side of the disk.

But under certain conditions, the 1571 defaults to single-sided mode, giving only 644 free blocks on a newly formatted disk. When this happens, the 1571 also recognizes only 644 blocks, even if the disk has been formatted with 1,328. Here's the story on controlling the single-or double-sided mode of your 1571.

If you use C128 mode to format a disk, it will be formatted on both sides with 1,328 free blocks. Also, C128 mode will read any 1541/1571 disk, regardless of how it is formatted.

If you use a C128 in C64 mode, the 1571's status depends on how you entered C64 mode. If you entered it with a GO64, the 1571 will behave exactly as it does in C128 mode—it will treat the disk as double-sided, and will also read single-sided disks.

But if you entered C64 mode by holding down the Commodore key as you powered up, the 1571 will behave as though it were a single-sided drive like the 1541. Disks will be formatted with 644 blocks free, and the drive will recognize only the first 644 blocks on any 1,328 block disk you may use in it.

The 1571 also behaves like a 1541 if you use it with a C64 or any other serial-bus-compatible computer.

But take heart! One simple command will put your 1571 into double-sided mode, regardless of the computer it's connected to. When you power up in anything other than C128 mode, just execute the following line:

```
OPEN 15,8,15,"U0>M1" : CLOSE 15
```

Your disk drive will now behave in all respects as a double-sided drive. To insure that this will always be the case, turn the command into an autobooting program and put it on all your disks. You accomplish this, of course, by using the Autoboot Maker program found on the 1571 Test/Demo disk.

And speaking of double-sidedness—it's a good idea to buy double-sided diskettes for use with your 1571. If you shop in the right places, they cost just a little bit more than the single-sided ones, and they're likely to be more satisfactory in the long run. Most single-sided disks will work all right, but when you use them you nevertheless run the risk of losing data on the second side. In my own case, I haven't discarded any of my old single-sided disks, and I use them freely in my 1571. But when buying new disks, I only buy the double-sided variety.

Louis F. Sander
Pittsburgh, Pennsylvania

BY CHARLES J. NICOL

Construct an Analog Absolute Joystick

for the Commodore 64

The Commodore 64 has two 9-pin game-control ports which can be used to interface digital or analog joysticks. Digital joysticks, which are the type generally available commercially, consist of four momentary switches. The direction that the joystick handle is moved determines which of the four switches are closed. The Commodore connects to these switches through pins 1 through 4 of the game-control port. Digital joysticks can feed only direction information into the Commodore.

Absolute (or analog) joysticks, on the other hand, consist of two variable-resistance potentiometers. The resistance of the potentiometers is read by the Commodore 64 through the game port pins 5 and 9 then digitized into two numbers between 0 and 255. These values represent the x,y coordinates of the joystick's position and can be read at any time by a simple peek to memory locations 54297 and 54298. These are the addresses where the analog-to-digital x,y registers of the Sound Interface Device (SID) are memory-mapped into the Commodore 64.

The advantage of an absolute joystick is its speed of positioning. A set position of the joystick corresponds to a unique set of values between 0 and 255. From these values the 64 knows how far the joystick is pushed and in what direction. A digital joystick can only tell the computer the direction the joystick is pushed—forward, backward, left, or right.

Suppose you have an absolute joystick controlling a cross-hair cursor on a video screen. When you move the joystick, the cursor immediately jumps to the corresponding location. When the joystick is released, the cross-hair cursor and the absolute joystick maintain their positions.

If you have a digital joystick controlling a cross-hair cursor, you must push the joystick in the direction you want the cross-hair cursor to move. The software continues to move the cursor until it reaches the border or the joystick is released. When the digital joystick is released, it resumes its no-direction upward position and the cursor freezes at its last position.

The absolute joystick clearly has superiority in its speed of positioning. Also, the physical position of the joystick can be maintained.

As we pointed out, the analog absolute joystick contains two variable-resistance potentiometers. The Commodore 64 converts the analog resistance of the potentiometers into two digital bytes of information. The key to the conversion lies deep inside the 64's 6581 Sound Interface Device (SID). Aside from providing a three-voice music synthesizer, the SID includes two analog-to-digital converters that allow interfacing to the potentiometers. These inputs appear on pins 5(POT AY) and 9(POT AX) of game-control port #1 (see Figure 1).

> *Digital joysticks—the kind generally available commercially—feed only direction information to the 64. An absolute joystick, however, also knows how far the joystick was pushed.*

The absolute joystick's digitized coordinate values can be seen at any time by running the following program line:

```
PRINT"X= "; PEEK(54297); " Y= ";PEEK(54298)
```

Each x or y value will be between 0 and 255. In a game application, these values can be used to direct sprites or characters quickly to any position on the screen. In a word processor or business application program, the values can be used to position the cursor on the screen with lightning speed.

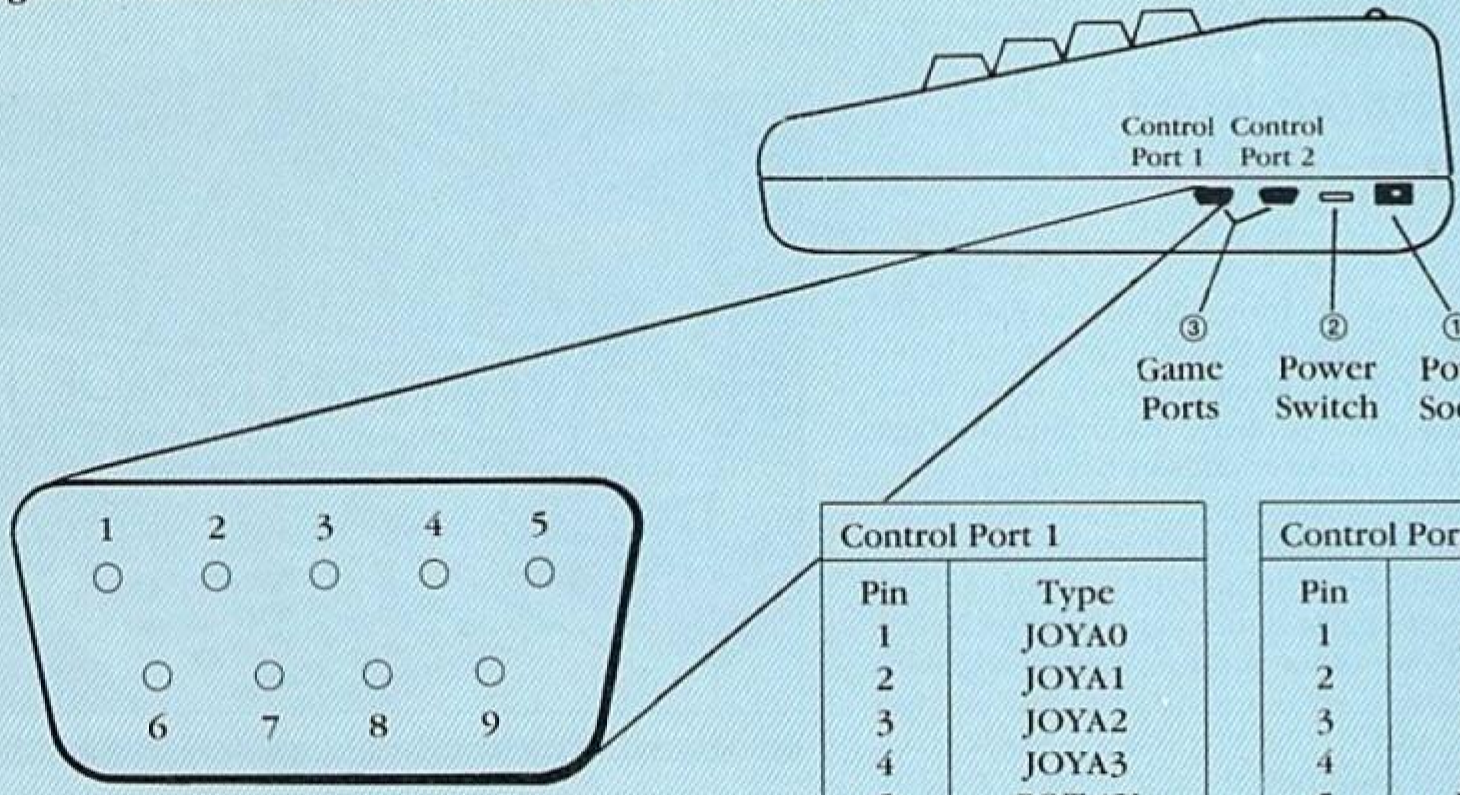
An optional momentary fire button could be added between pins 6(BUTTON A) and 8(GND) of game-control port #1. The fire button can be tested for game control port #1 by checking bit 4 of location 56321 (location 56320 for game-control port #2). When the fire button is closed, bit 4 changes from a one state to a zero state. To test bit 4 of game control port #1, run the following program line:

```
IF(PEEK(56321)AND16)=0 THEN PRINT"FIRE
BUTTON #1 DEPRESSED"
                    OR
IF(PEEK(56320)AND16)=0 THEN PRINT"FIRE
BUTTON #2 DEPRESSED"
```

Figure 2 shows a schematic representation of the absolute joystick wiring. All parts that are needed for building the joystick are readily available from Radio Shack, and are listed in Figure 3. Solder the circuit according to the schematic shown in Figure 2. The joystick and optional fire button can be mounted on a wood base for more support.

It is possible to attach a second absolute joystick to game-control port #2. The x,y values are read through the same addresses as port #1, however, the Commodore 64 can ready only one absolute joystick at a time. It normally is set to read port #1. In order to read port #2, you must set bits 6 and 7 of port A of the Complex Interface Adapter (CIA) as shown in Figure 4.

Figure 1. Game-Control Port Location and Pin-Out


Control Port 1
Control Port 2
③ Game Ports
② Power Switch
① Power Socket
1
2
3
4
5
6
7
8
9

Control Port 1	
Pin	Type
1	JOYA0
2	JOYA1
3	JOYA2
4	JOYA3
5	POT AY
6	BUTTON A/LP
7	+5V
8	GND
9	POT AX

Control Port 2	
Pin	Type
1	JOYB0
2	JOYB1
3	JOYB2
4	JOYB3
5	POT BY
6	BUTTON B
7	+5V
8	GND
9	POT BX

Note: Port #2 Pin-Out is Identical to the Port #1 Pin-Out.

Figure 2. Schematic Diagram

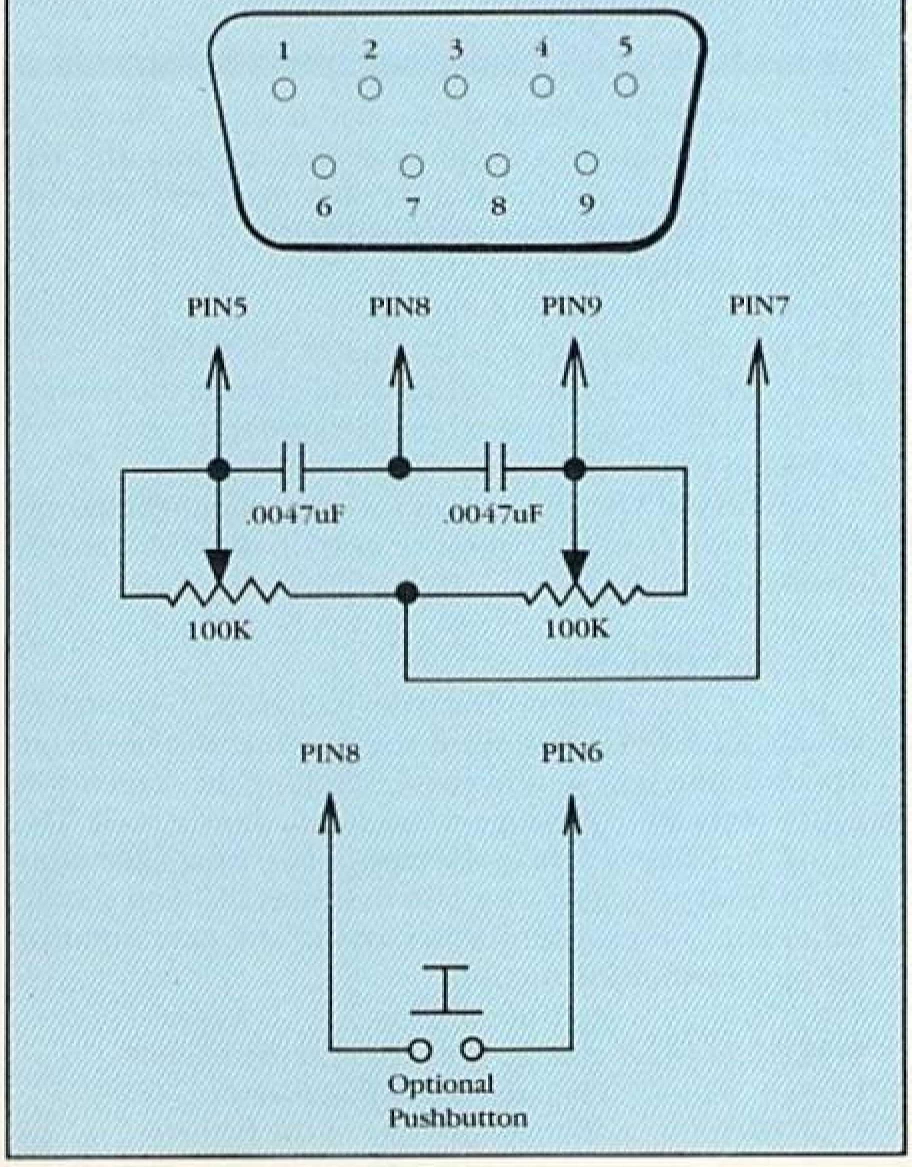

1
2
3
4
5
6
7
8
9
PIN5
PIN8
PIN9
PIN7
.0047uF
.0047uF
100K
100K
PIN8
PIN6
Optional Pushbutton

Figure 3. Parts List

QUANTITY	ITEM DESCRIPTION	RADIO SHACK PART #
2	100K JOYSTICK	271-1705
1	FEMALE 9-PIN CON.	276-1538
2	.0047uF CAPACITOR	272-120
1	MOMENTARY SWITCH	275-1566
	MISC. WIRE, SOLDER	

Figure 4. CIA#1 Port A

BIT 6	BIT 7	SELECT
0	1	PORT B
1	0	PORT A

CIA#1 port A is memory-mapped into Commodore 64 address 56320. Since CIA port A is used for the keyboard column scan also, you must use a machine-code routine in order to switch these bits and then read game control port #2. If you attempt to change bits 6 and 7 using BASIC, the keyboard scanning routine will have changed it to port #1 before you have a chance to read the game port #2 potentiometer values.

An excellent machine-code routine to read analog game port #1 and 2 and the fire buttons can be found on page 347 of the *Commodore 64 Programmer's Reference Guide*. If one absolute joystick is enough for your application, use game control port #1 and avoid using machine-code routines. ◼

JIFFIES

BY IAN ADAM

Screen Banner

for the Commodore 64 and VIC 20

Very large and complex programs are available for operating a scrolling "bulletin board" system, and this program is not one of those. What it does do, however, is give you a very handy way to leave a scrolling message on your computer screen for friends or family.

In addition to leaving messages, you can also work this routine into another program, and use the banner to give instructions, advice in an adventure game, and so on, while the other program is running. That's because it takes advantage of one of the most interesting capabilities of computers—to carry out more than one function simultaneously. Actually, the computer's single-track mind can deal with only one thing at a time, but, by rapidly switching between tasks, it can give the impression of having a split personality.

How It Works

The program that you type in is a BASIC loader for a machine-language routine starting at memory location 49152 in the 64 (679 in the VIC) that taps into the computer's operating system. After running it, you can NEW the BASIC without affecting the banner—it will keep running.

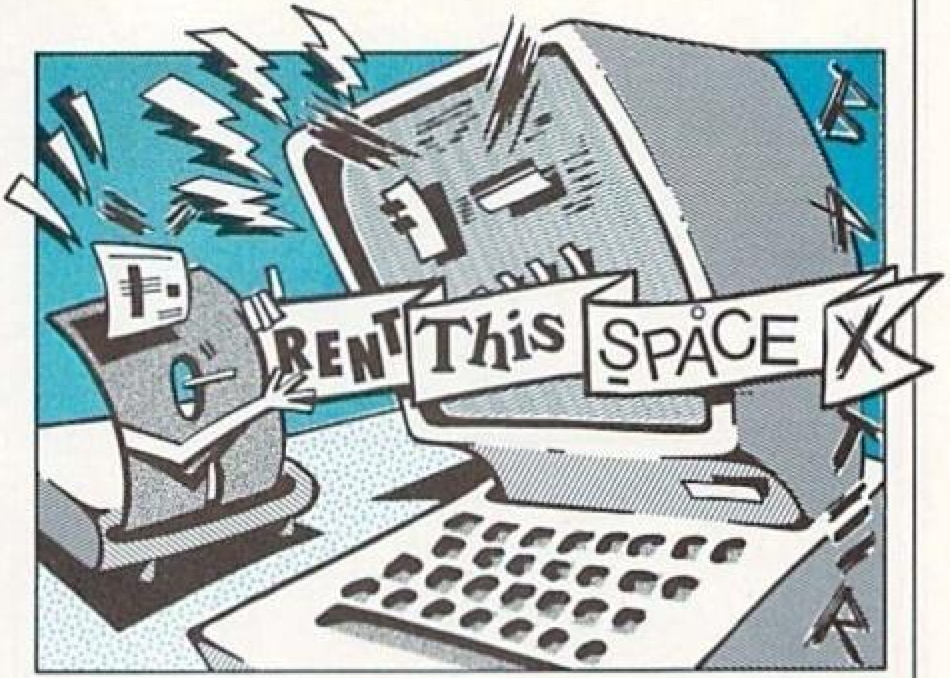
The machine code generated by the BASIC loader hooks on to the standard interrupt routine, which is part of the operating system that is executed 60 times every second, and takes care of a lot of those mundane computer jobs like checking peripherals and watching the time. In effect, printing the message on the screen becomes part of the computer's list of jobs to do.

This message can be up to 255 characters long, or 204 characters on the VIC. If your message is shorter than this, spread it out with spaces, asterisks, or graphic characters to add more flair. If it's longer, you'll have to break it into parts and display one at a time. When you've had enough, simply hold down RUN/STOP and tap the RESTORE key to get rid of the message.

64 Version

This version takes advantage of some additional hardware features of the 64. Because of the extra RAM available to hold the program, the banner text is actually printed in the cassette buffer instead of on the normal screen. The video chip in the 64 allows generating "raster interrupts," which alert the microprocessor when a specified part of the screen is being drawn by your monitor or television set.

When this chip indicates that the bottom line of the screen is about to be drawn, the banner display is rapidly switched into view. As a result, there is no conflict when scrolling the screen, as the banner is stored elsewhere. At the same time, the horizontal position of the screen is rapidly changed one dot at a time. There's a surprising amount of technology packed into the 64, and applying it in this way results in a very smooth motion of the banner across the screen.



The message can be up to 255 characters long on the 64. If your message is shorter than this, spread it out with spaces, asterisks or graphic characters to add more flair.

Some further notes:

SYS 49152	activate display
POKE 49270, X	change text color in the banner
POKE 49284, X	change background color in the banner
POKE 49285, X	change screen background color
GOSUB 5400	change message in the banner

As with the VIC, the banner program should be terminated before any tape input or output; the disk drive is unaffected.

VIC 20 Version

In the VIC version, first you will have a choice of which screen line you want the message displayed on. The first line is best; otherwise, scrolling the screen will cause part of the message to be scrolled up as well. The actual message is held in the tape buffer, which accounts for its limited length. This also indicates that you should terminate the program before trying any tape input or output. Further instructions:

SYS 679	activate display
POKE 721, X	change text color in the banner
GOSUB 5400	change screen line banner is on
GOSUB 5600	change message in the banner

This useful program scrolls a message banner smoothly across the computer's screen, while other programs run unaffected.

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Screen Banner BASIC Loader

```
100 GOSUB 5000: REM TITLE'CKGX
110 GOSUB 5200: REM POKE'CJAY
120 GOSUB 5400: REM MESSAGE'CMKB
130 GOSUB 5600: REM INSTRUCTIONS'CRND
140 SYS 49152:REM ACTIVATE'COND
150 END'BACA
160 :'ABHB
5000 REM TITLE'BFRY
5010 :'ABHX
5020 PRINT CHR$(147)'CFBB
5030 PRINT" SCREEN BANNER 64:"'BAIF
5040 PRINT" -----------------"'BAXE
5050 PRINT" BY IAN ADAM[DOWN]"'BACF
5060 PRINT"THIS PROGRAM SCROLLS A
     BANNER MESSAGE"'BAXN
5070 PRINT"ACROSS THE BOTTOM OF THE
     SCREEN"'BAKN
5080 PRINT"USING THE 64'S SPLIT
     SCREEN AND"'BANN
5090 PRINT"FINE-SCROLLING
     CAPABILITIES."'BADO
5100 RETURN'BAQX
5110 :'ABHY
5200 REM POKE DATA'BIPB
5210 :'ABHA
5220 PRINT"[DOWN]NOW LOADING
     DATA..."'BATG
5230 FOR I=49152 TO 49291'DLUG
5240 READ X:POKE I,X'CFYF
5250 CH=CH+X:NEXT'DGIH
5260 IF CH<>18358 THEN PRINT"CHECKSUM
     ERROR - DOUBLE-CHECK DATA!"
     :STOP'GIGT
5270 RETURN'BAQG
5280 :'ABHH
5290 REM  TYPE DATA CAREFULLY !!!'BUTN
5300 :'ABHA
5310 DATA 120,169,127,141,13,220,169,
     1,141,26,208,169,27,141,17,208,
     169,28'BOVN
5320 DATA 141,20,3,169,192,141,21,3,
     88,96,173,25,208,141,25,208,162,
     0'BJUN
5330 DATA 189,130,192,141,24,208,189,
     132,192,141,33,208,189,134,192,
     141'BLJP
5340 DATA 22,208,189,136,192,141,18,
     208,138,73,1,141,35,192,240,3,76,
     188'BMIQ
5350 DATA 254,165,162,73,7,41,7,141,
     134,192,201,7,208,43,174,138,192,
     232'BMXR
5360 DATA 236,139,192,208,2,162,0,142,
     138,192,160,216,189,140,192,153,
     232'BNXS
5370 DATA 2,232,236,139,192,208,2,162,
     0,200,208,239,169,0,160,39,153,
     192'BMOT
5380 DATA 219,136,16,250,76,49,234,5,
     21,14,6,7,200,250,242,235,
     255'BGYT
5390 :'ABHJ
5400 REM  ENTER MESSAGE'BMSF
5410 :'ABHC
5420 PRINT"[DOWN,SPACE2]
     *PRESS RETURN TO PROCEED[UP]"
     :INPUT A$'CDFM
5430 PRINT"[CLEAR]";'BBDF
5440 A$="[SPACE40]"'BCXL
5450 FOR I=1 TO 3:PRINT A$:NEXT'FHTK
5460 PRINT TAB(15)CHR$(18)A$'DJBK
5470 PRINT"[DOWN]TYPE MESSAGE IN AREA
     ABOVE, USING LOTS"'BAAS
5480 PRINT"OF SPACE, THEN PRESS
     RETURN"'BAXQ
5490 POKE 631,19:POKE 198,1'CMAN
5500 INPUT A$'BCIC
5510 A=49291:B=1023'CMOG
5520 FOR I=1 TO 255'DFLG
5530 POKE A+I,PEEK(B+I):NEXT'FIAJ
5540 RETURN'BAQG
5550 :'ABHH
5600 REM INSTRUCTIONS'BMRH
5610 :'ABHE
5620 PRINT"[DOWN4]ADJUSTMENTS
     :[DOWN]"'BAIJ
5630 PRINT"POKE 49270, TEXT
     COLOUR"'BAJM
5640 PRINT"POKE 49284, COLOUR OF
     BANNER"'BAGO
5650 PRINT"POKE 49285, COLOUR OF MAIN
     SCREEN"'BAKR
5660 PRINT"SYS[SPACE2]49152[SPACE2]
     ENABLE MESSAGE"'BADP
5670 PRINT"GOSUB 5400[SPACE2]
     NEW MESSAGE"'BAYQ
5680 RETURN'BAQL
```

END

VIC 20 Screen Banner BASIC Loader

```
10 PRINT CHR$(147)
20 PRINT"SCREEN BANNER VIC 20"
30 PRINT"--------------------"
40 PRINT"BY IAN ADAM[DOWN]"
50 PRINT"THIS PROGRAM SCROLLS ABANNER
   MESSAGE ACROSS"
60 PRINT"THE SCREEN USING THE"
70 PRINT"VIC'S INTERRUPT"
80 PRINT"CAPABILITIES."
90 PRINT"[DOWN]NOW LOADING DATA..."
100 GOSUB 5300
```

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```
110 INPUT"[DOWN]PRESS RETURN";A$
120 GOSUB 5400:GOSUB 5600
130 END
5270 :
5280 REM READ AND POKE DATA INTO
     MEMORY
5290 :
5300 FOR I=679 TO 740
5310 READ A:POKE I,A
5320 T=T+A:NEXT
5330 IF T<>7370 THEN PRINT"CHECKSUM
     ERROR - DOUBLE-CHECK DATA!":STOP
5340 RETURN
5370 :
5380 REM WHICH LINE ?
5390 :
5400 PRINT"[DOWN]PICK A LINE FOR"
     :PRINT"THE MESSAGE"
5410 PRINT"1 IS TOP LINE,"
     :PRINT"23 IS BOTTOM LINE"
5420 INPUT"WHICH LINE";N%
5430 IF N%<1 OR N%>23 THEN 5410
5440 X=22*N%+256*(PEEK(648)-1)
5450 Y=X AND 255
5460 POKE 718,Y:POKE 723,Y
5470 X=(X-Y)/256:POKE 719,X
5480 POKE 724,X+120-16*(PEEK(648)<30)
5490 RETURN
5570 :
5580 REM ENTER MESSAGE
5590 :
5600 A$=CHR$(164):PRINT CHR$(147);
5610 FOR I=1 TO 204:PRINT A$;:NEXT
     :PRINT CHR$(215)
5620 PRINT"TYPE MESSAGE AT TOP OF";
     :PRINT"SCREEN, USING LOTS OF"
5630 PRINT"SPACE, MOVE CURSOR"
     :PRINT"TO [SHFT W],
      PRESS RETURN."
5640 PRINT"[DOWN]ADJUSTMENTS:"
5650 PRINT"POKE[SPACE2]721,
      TEXT COLOR"
5660 PRINT"SYS[SPACE3]679: MESSAGE ON"
5670 PRINT"GOSUB 5400:CHANGE LINE";
5680 PRINT"GOSUB 5600:NEW MESSAGE";
5690 POKE 631,19:POKE 198,1
5700 INPUT A$
5710 A=820:B=PEEK(648)*256
5720 FOR I=0 TO 203:S=PEEK(B+I)
5730 IF S=100 THEN S=32
5740 POKE A+I,S:NEXT
5750 SYS 679:RETURN
5800 :
5810 REM  ENTER DATA  CAREFULLY !!!
5820 :
5830 DATA 120,169,180,141,20,3,169,2,
     141,21,3,88,96,165,162,41,7,208
5840 DATA 38,174,227,2,232,236,228,2,
     208,2,162,0,142,227,2,160,234,189
5850 DATA 52,3,153,22,29,169,0,153
5860 DATA 22,149,232,236,228,2,208,2,
     162,0,200,208,234,76,191,234,0,
     204
```

BY WILLIAM BARTON

The Mad Poet

for VIC and Commodore 64

What, I ask you, does a simple mechanic do when he gets a home computer for Christmas? Easy enough, you say, he goes out and buys a lot of game cartridges for it! That's okay for a first guess, but your average simple mechanic just doesn't make enough money for that—the $21.00 an hour you see on that repair bill goes mostly to the simple garage owner. No, he reasons, I must sit down and design my own software.

So, after puzzling out the intricacies of BASIC for a while (ripping out much-needed hair in the process), he begins to write programs. Games, he thinks, will surely be fun. So the bouncing-ball example that came with his new toy begins to evolve, and soon it has a randomly generated maze, a pursuing monster, a fleeing quarry. Great! But our mechanic now realizes that while writing the thing was fun, twitching the little joystick is *boring.*

By this time, of course, he's read a few magazines and heard about things like adventure games, so he decides to try one of those. A few more weeks of desperate self-mutilation and out comes a nice little matrix-controlled stack of 1,000 rooms—a subterranean cube full of monsters and magicians, forests, evil spells, and pools of hot, bubbling lava.

"Now we're getting somewhere!" he thinks. But, alas, our intrepid mechanic never was much of a game player. Monopoly® and Risk® defeated him as a youth, and now his own creation joins the cadre of things he can't win at. His nine year-old son is having a grand time, but he just sits in a dark corner, muttering bleakly about the ghost of Mary Shelley.

A train of association begins to form. Once upon a time, ages ago in fact, this mechanic was an educated man. Mary Shelley, he recalls, had a husband named Percy, himself a writer, not of science fiction, but of poetry. (Hail to thee, blythe spirit!) In an effort to get the computer monster out of his head (and poor, shredded hair), he takes down a book and begins to read.

It doesn't work. Skylarks and Hymns to Intellectual Beauty are no match for that pale keyboard glinting evilly from its place by the TV. Other recollections take hold, crowding out nobler thoughts with ease.

Somewhere, long ago, he'd met an engineer, a man who liked to talk about the big computers he worked with and the things they could do. The engineer was an amateur musician and enjoyed telling about the compositions he'd done with his giant machine. Music, it seemed, followed a not-too-complex set of mathematical rules.

The mechanic looked back at the printed page and began to wonder. Hadn't he read, sometime, that computers could be made to write stories of a sort—and poetry? They had been big computers, to be sure, but maybe on this little one there was a way to.... He went back and turned the devil on.

SONNETS
-OF-
DR.
SEUSS

What, after all, is a poem? Nothing more, he reasoned, than an idea embedded in a complexly ordered array of words. Surely, it would be a simple thing to give the machine a list of words and some rules for ordering them. It seemed like the sort of problem that a mechanic could solve, so he began to type.

What, after all, is a poem? Nothing more than an idea embedded in a complexly ordered array of words.

Obviously, a first approximation of a poetry-writing program could not be too complex, or he would get lost in the ramifications of his own creation. In any event, his computer wouldn't hold that much of an epic.

Getting a list of words in there turned out to be simple. This, he thought, is what data statements are *really* for. He put in a few dozen words, clustering them in groups of five so the foolish thing could choose among them, then count ahead to the next set.

What about ordering? Well, the organization couldn't be too complex. Again, there were those stringent size limitations, and he had no idea how to put the real rules of grammar into a machine. No one even knows for sure how human brains do it—just that it involves things called Broca and Wernicke and Arcuate Fasciculus. Maybe a simpler set of rules would do, this being a first try.

What does a line of poetry contain, when you think about it? Obviously, a certain number of words. Fine, he thought, that's what local variables are for, just like in

You can change the sort of poems that this program writes, customizing it after a fashion, by changing the content of the data statements.

games. Punctuation? Well, there are rules for that, too, but we're being *simple* here. Let it go in *ex post facto,* as a fixed feature of every poem.

Now what's left? With the words chosen and put in an organized table, nothing more than giving the monster a way of choosing them. He scratched his unshaven chin and decided that RND would do just fine. A few little refinements later and it was done. He looked out the window and wondered, "How did it get so dark out there?"

The Mad Poet had a fancy title page (lines 5-65), a structural controller (70-100), a list of possible words (200-360), and a means of sifting through them (100-150). With no small trepidation, he typed in RUN and pushed the button:

The screen did its tricks, and said:

I soared wandering
  into that
  towering strand
Of dark-kings flat
  near the sea,
From a merry maze of
  lords demand
That all grew by the
  alien tree.

The mechanic went back and corrected a few things (what, after all, does "raishing" mean?), then sat back to admire his simple-minded but still meaningful creation. It was a start.

And what next? A sonnet machine? A way to predict the future through computerized numerology? Who knows? By golly, there's a whole world just waiting out there!

Oh, one more thing. The original template for these poems was "The Forever Tree," which appeared on page five of *Hunting On Kunderer* (published by Ace Books, (c) 1973 by William Barton). This was stanza three, and it goes:

"We went wandering across the sparkling strand
Of sand-stars set in the sea,
From the shrieking land of kings so grand
That they lived by the forever tree."

You can change the sort of poems that this program writes, customizing it after a fashion, by changing the content of the data statements. Words on the same line should have the same number of syllables if you want your poem to scan more or less properly and, obviously, free verse works better than rhyming.

These poems can be lengthened almost indefinitely (within the limits of a particular computer) by changing the values used for "x" in line 100, along with the various items which refer to it, in conjunction with an expanded list of data statements. At one point, I tried substituting variations on Shelley's rather obscure poem "Mutability" for my own work, and got some very silly verse indeed!

If you look closely and use a little imagination, the secret of how to implement "wordwrap" on a home-made word processor is contained in line 105.

Klaatu barada nikto! ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

The Mad Poet

Do not use the Magazine Entry Program to enter the VIC version.

```
5 A$="*THE*MAD*POET*BYWILLIAM BARTON"
  :DIM N%(27):C=36879:SH=36864'EYWT
10 V=C-1:S4=C-2:S3=C-3:S2=C-4:S1=C-5
   :SV=SH+1:SC=SH+2:SR=SH+3
   :VA=PEEK(SC)'SXVV
15 PRINT"[CLEAR,BLACK]":POKE C,234
   :POKE S1,201:POKE S4,201'EUSJ
20 FOR X=0 TO 22:POKE SC,
   PEEK(SC)AND 128 OR X
   :POKE SR,PEEK(SR)AND 129
   OR(X*2)'MGTN
25 POKE SV,69-(X*2):POKE SH,
   17-INT(X/2):POKE V,INT(X/2)
   :NEXT'LCOQ
30 POKE V,0:POKE S1,0:POKE S4,0
   :POKE SH,5:POKE SV,25:POKE SC,VA
   :POKE SR,46'HLOL
35 FOR T=1 TO 140:READ W$:NEXT'FJHI
40 FOR T=0 TO 27:READ W:N%(T)=W:NEXT
   :W=0'HRBI
45 PRINT SPC(113);:FOR T=1 TO 14
   :GOSUB 150:NEXT'HPAM
50 PRINT SPC(55);:FOR T=15 TO 16
   :GOSUB 150:NEXT'HPMI
55 PRINT SPC(40);:FOR T=17 TO 31
   :GOSUB 150:NEXT'HPFN
60 FOR T=1 TO 2000:NEXT'EHRF
65 RESTORE'BAOH
70 PRINT"[CLEAR]":FOR Y=1 TO 4
   :PRINT CHR$(13):'GKHJ
75 FOR Z=1 TO 7:GOSUB 100:NEXT
   :IF Y=2 THEN PRINT"[LEFT],"'JLKQ
80 NEXT:PRINT"[LEFT].":PRINT"[DOWN]
   HIT [RVS]SPACE[RVOFF] FOR NEXT
   [SPACE6]POEM...":GOSUB 135'EGOQ
85 GET A$:IF A$<>" "THEN 85'FHYN
90 RESTORE'BAOF
95 GOTO 70'BCOK
100 X=INT(RND(TI)*5)+1:FOR T=1 TO X
    :READ W$:NEXT'KRPF
105 IF POS(X)+LEN(W$)>20 THEN PRINT
    CHR$(13)TAB(3);'JQVJ
110 PRINT W$CHR$(32);:GOSUB 135
```

Continued on pg. 113

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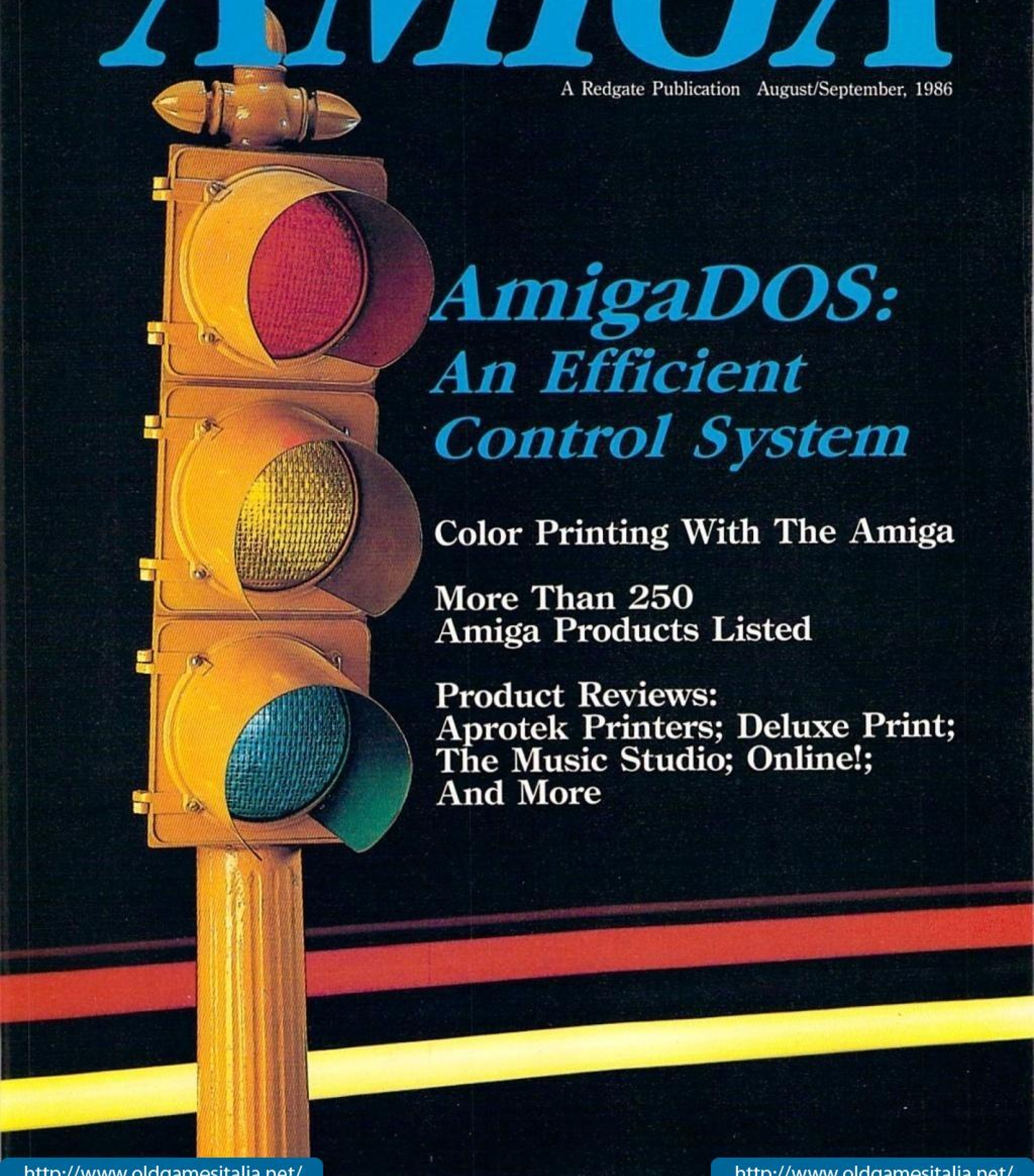

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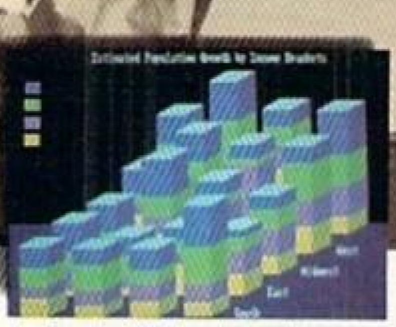

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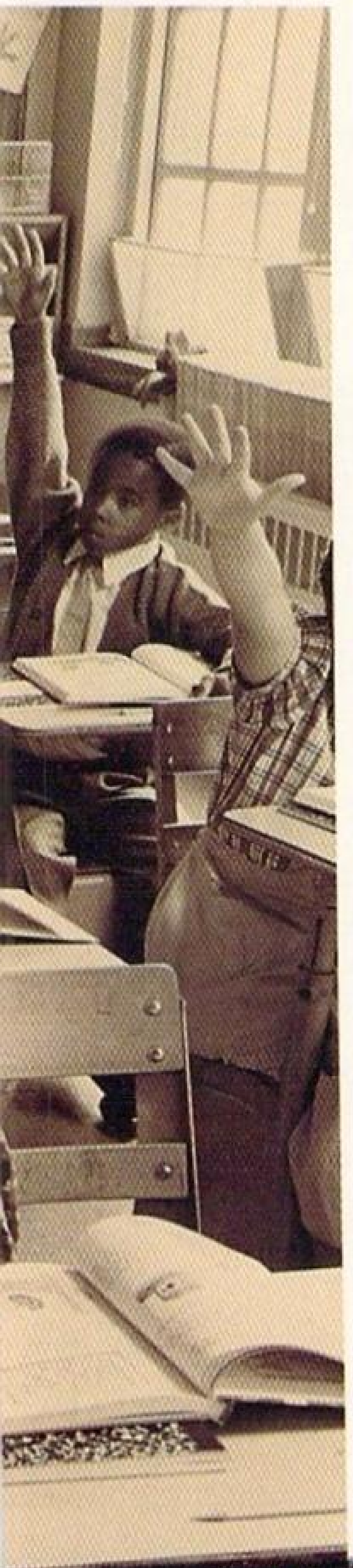

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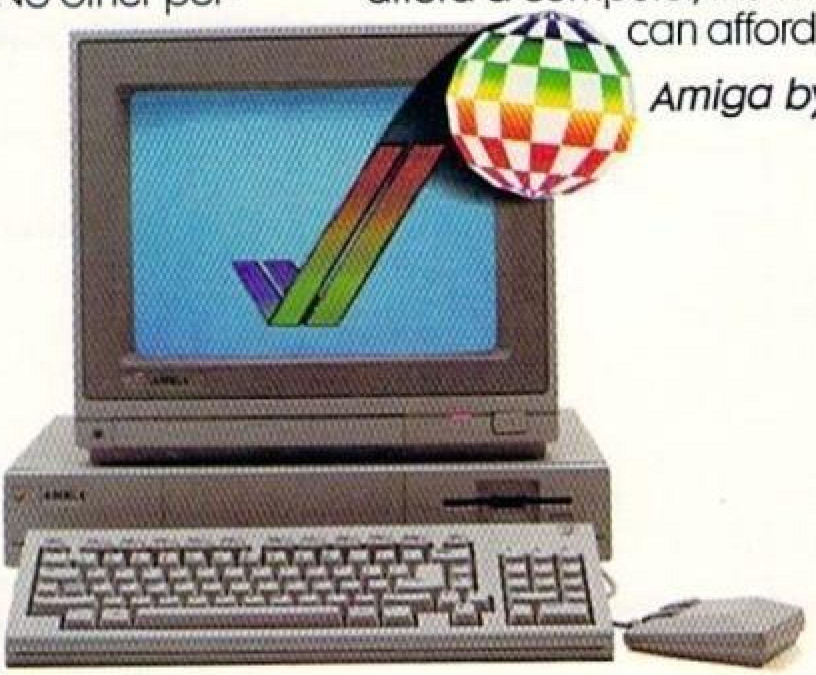

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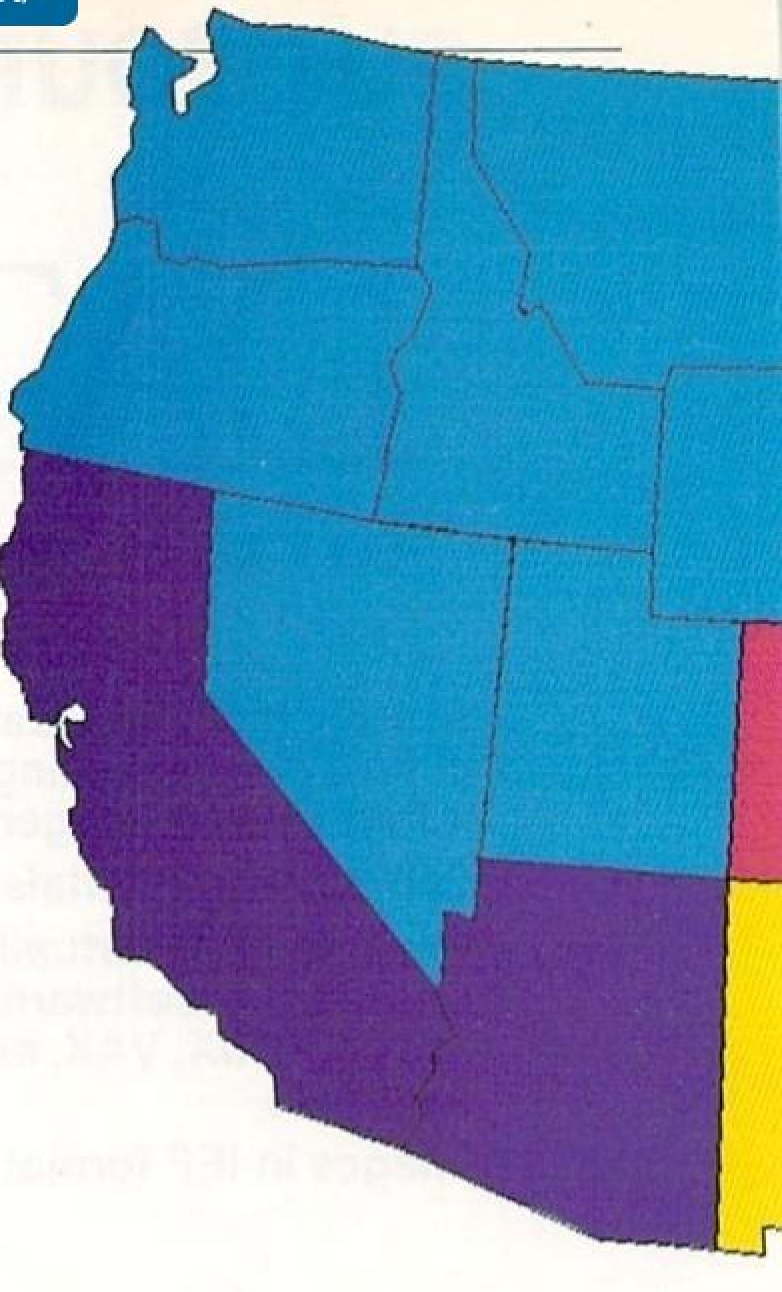


Color Printing

With The Amiga

A wide selection of color printers, plotters, and software is now available.

Your Amiga computer sees the world in color, 4,096 different shades of color to be precise. With the Amiga-compatible printers coming to market, you can transfer this wealth of colors to paper.

While the present selection of color printers for the Amiga is limited, there are enough machines available to satisfy most Amiga owners. The current selection varies in both quality of print and price. Here's a sampling:

- Okimate 20; $149 retail; Okidata; 111 Gaither Dr.; Mt. Laurel, N.J. 08054.

The Okidata Okimate 20 is the lowest-priced dot-matrix color printer available for Amiga users. The Okimate has a 24-element print head that can produce over 100 shades of color with decent graphic definition.

For word processing, the Okimate can print near-letter-quality (NLQ) at a speed of 40 characters per second (cps). For utility uses, the Okimate can print at 80 cps. It has a printing width of 80 columns with standard characters and 136 columns with condensed characters.

The Okimate 20 is packaged with Okimate's *Advance Color Screen Print* program that allows you to control print functions. The printer uses smooth or thermal paper and can also print on acetate transparencies. To run the Okimate, you'll need the Amiga Plug 'N' Print module. It sells separately for $99.

- Okidata 292 and 293; $699 and $899 retail respectively.

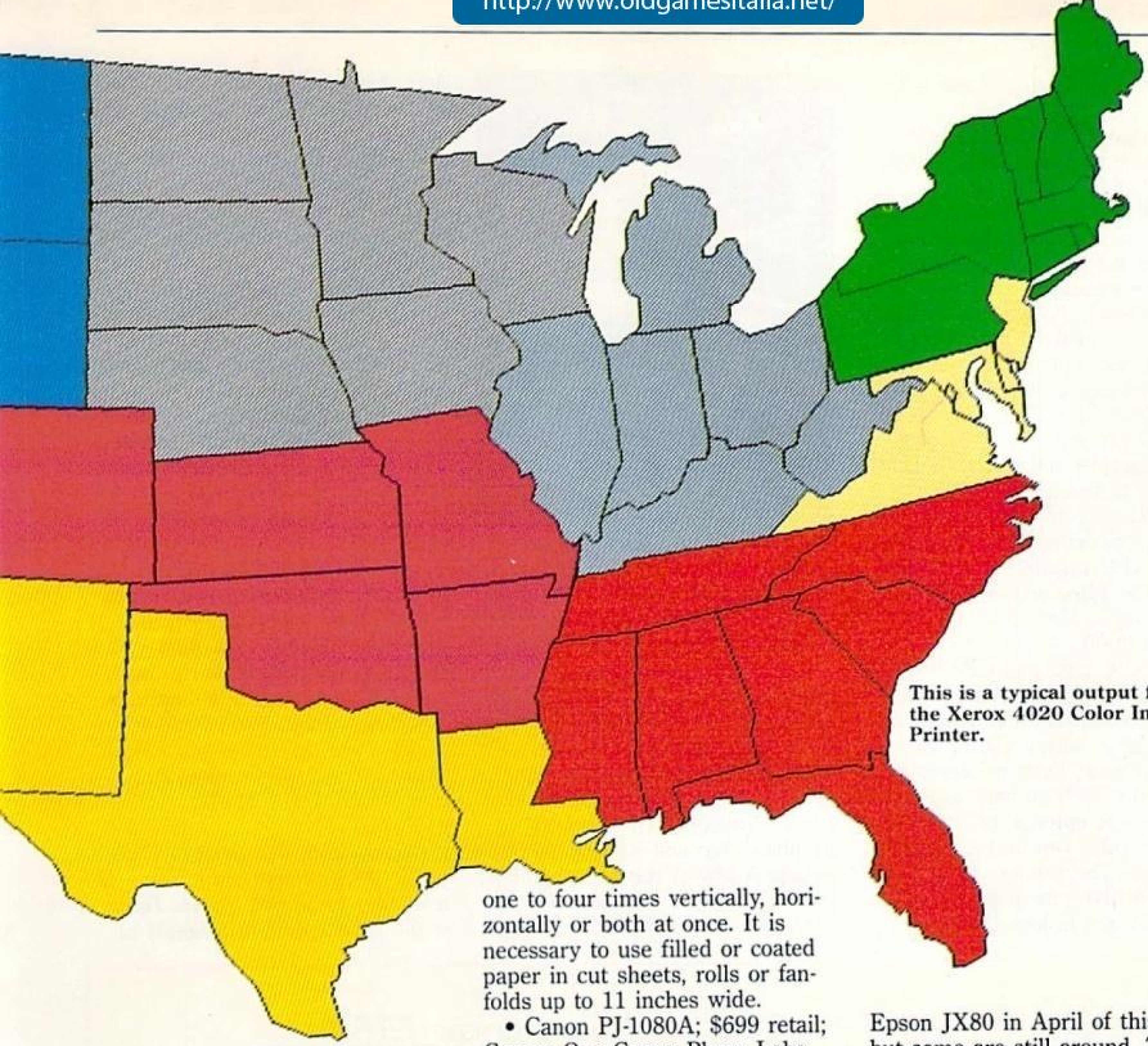
The newest additions to the Okidata line are these two dot-matrix printers. Both printers use an 18-pin printing head for better overall print quality. The 293 has a 15-inch carriage, and the 292 has the standard 11-inch carriage.

Depending on density setting, both machines print anywhere from 5 to 20 inches per second. The 292 and 293 print over 100 colors using four basic color ribbons: black, magenta, cyan and yellow. Both machines use single-sheet or continuous roll paper and have automatic paper-insertion options. The 292 and 293, like the Okimate 20, require a Plug 'N' Print module to interface with the Amiga.

- The Juki 5510 Dot Matrix; $648 retail; Juki; 20437 S. Western Ave.; Torrance, Calif. 90501; 800-325-6134.

The Juki 5510 provides high-quality reproduction at an affordable price. The Juki is capable of printing in 10 different fonts at two different speeds: near-letter-quality at 30 cps, and draft quality at a speedy 180 cps. It is also capable of logic seeking and bidirectional printing.

The Juki's buffer has 3K worth of memory and is expandable to 15K, and the printer uses both friction and tractor feeds for cut-sheet and continuous roll paper. The Juki can handle complex Amiga graphics with relative ease, printing them crisply and cleanly.



This is a typical output from the Xerox 4020 Color Ink Jet Printer.

- Xerox 4020 Ink Jet Printer; $1,495 retail; Xerox; 101 Continental Blvd.; El Segundo, Calif. 90245.

The Xerox 4020 is unquestionably the finest color printer for the Amiga computer. Its $1,500 price tag is well justified.

The Xerox 4020 has the ability to produce over 4,000 shades of color. It can print at two speeds: a standard 40 cps, or 120 by 120 dots per inch (dpi); and the enhanced 20 cps, which is 240 by 120 dpi.

The Xerox's enhanced resolution and wide range of colors combine to produce truly spectacular graphics. The Xerox offers five full character sets and a choice of 14 languages. Furthermore, text may be altered from one to four times vertically, horizontally or both at once. It is necessary to use filled or coated paper in cut sheets, rolls or fanfolds up to 11 inches wide.

- Canon PJ-1080A; $699 retail; Canon; One Canon Plaza; Lake Success, Long Island, N.Y. 11042.

The Canon PJ-1080A Color Ink-Jet Printer is a seven-color machine capable of printing at high speed. It features a noise level under 50 decibels (dB).

The PJ-1080A prints on single-sheet and continuous roll paper. It can also print on acetate transparencies. Each of the printer's color ink cartridges has a printing capacity of 3.2 million characters. The Canon machine prints 640 dots per line in hard-copy mode and 560 dots per line in graphics mode. It prints at a speed of 37 cps.

- Epson JX80 Dot Matrix; $399 retail; Epson; 2780 Lomita Blvd.; Torrance, Calif. 90505; 800-421-5426.

Epson stopped production of the Epson JX80 in April of this year, but some are still around. The Epson uses a four-color ribbon that prints in black, yellow, magneta or cyan. Colors such as violet, orange and green can be produced by having the printer overprint the four basic colors. A black ribbon can be substituted for the multicolor ribbon for word processing.

The JX80 features proportional spacing, tractor and friction feeds and a standard parallel communication interface.

Two fonts are built in: elite (12 characters per inch) and pica (10 characters per inch). Epson users have the option of downloading special fonts from the Amiga into the JX's memory. JX80 users may also alter print styles in a variety of ways. Type can be compressed, expanded, set in italic, underlined and put in superscripts and subscripts.

- Panasonic 1080; $399 retail; Panasonic; Secaucus, N.J. 07094; 201-392-4644.

The Panasonic 1080 is a printer with color capabilities. Technically, however, it's not a color printer. With the Panasonic 1080 you can print in black, brown, red or blue, but there's a catch. The 1080 can use only one color ribbon at a time, making color graphics a difficult chore. The Panasonic 1080 is still a great printer for doing charts, graphs and less complicated color pictures.

- NEC CP2 and CP3; $860 and $1,160 approximate retail respectively; NEC Information Systems, Inc.; 1414 Massachusetts Ave.; Boxborough, Mass. 01719; 617-264-8000.

The NEC CP2 and CP3 will be available for Amiga owners. Both these printers use the JX80 driver, but print with a clarity not found in most JX80 printers. The CP2 and CP3 both have four-color ribbons that automatically blend color, or color can be blended manually. The printers print at speeds of 216 cps in standard mode; 65 cps in letter-quality mode. In their graphics mode, the machines print between 60 to 360 dpi, depending on density setting.

The Okimate 20 from Okidata

Okay, you've selected a printer and removed it from its box. Now all you need is some software that will test its abilities. Luckily, several software manufacturers are designing programs that take full advantage of the Amiga's graphics chip and wide array of colors. A few of the better graphic programs on the market are:

- *Aegis Images*, $69.95 retail; *Aegis Animator*, $139.95 retail; *Aegis Draw*, $199.95 retail; Aegis Development, Inc.; 2210 Wilshire, Ste. 277; Santa Monica, Calif. 90403; 213-306-0735.

This trio of programs can turn your Amiga into a versatile art/drafting studio.

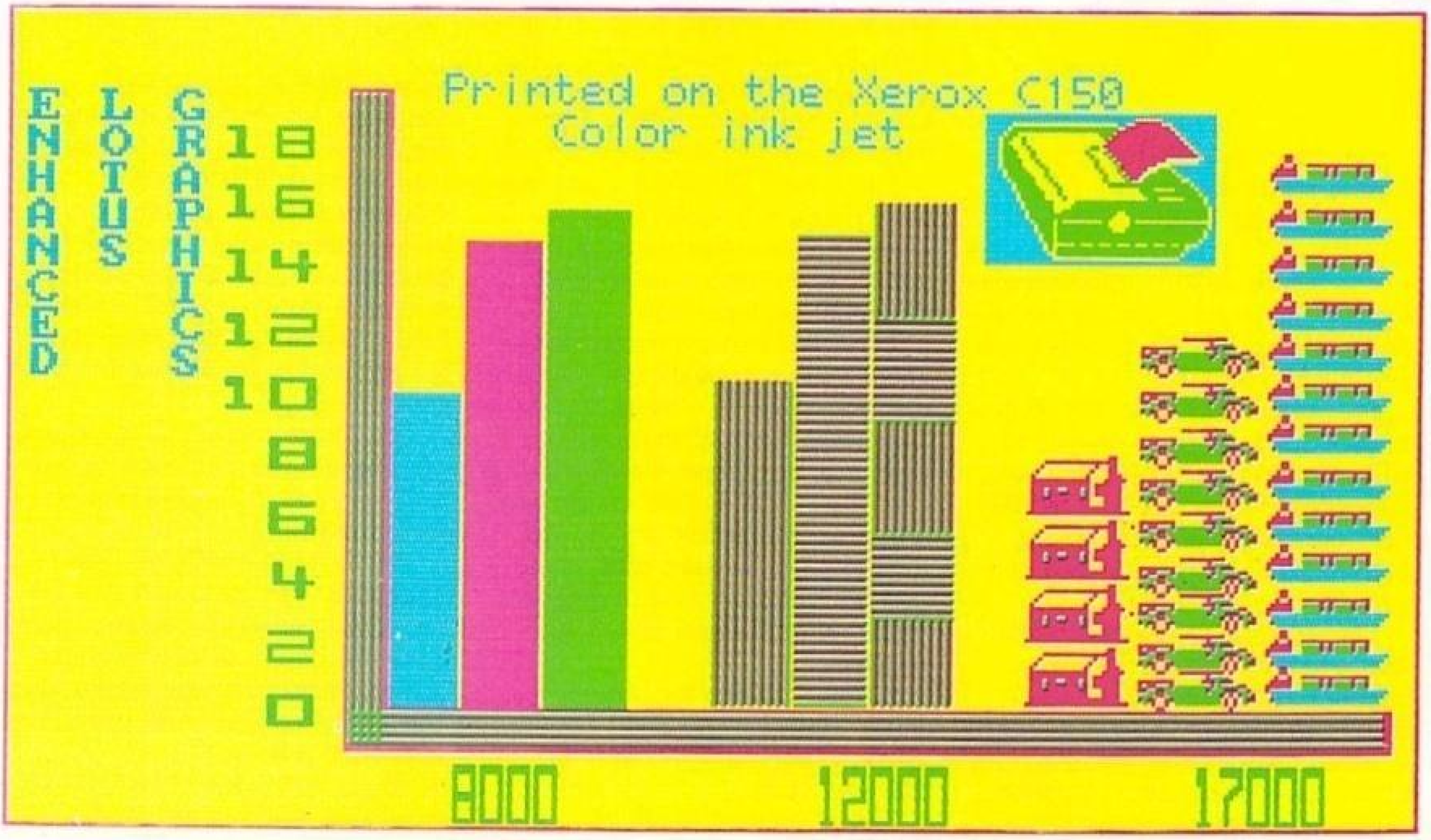
Aegis Images is a menu-driven painting program that includes color gradation, finger-painting, air-brushing, image-shrinking and magnification options.

Aegis Draw allows the user to create charts, graphs and architectural drawings. *Aegis Draw*'s capabilities can be enhanced by combining it with other paint programs.

Aegis Animator allows Amiga owners to create animated scenes on nine storyboards. This program is packaged with *Aegis Images*, so backgrounds can be added to enhance the animations.

- *Deluxe Paint*, $79.95 retail; *Deluxe Print*, $99.95 retail; Electronic Arts; 2755 Campus Dr.; San Mateo, Calif. 94403; 415-571-7171.

Deluxe Paint, like most of Electronic Art's "construction sets," is a wonder to behold. *Deluxe Paint* is the cornerstone of a family of



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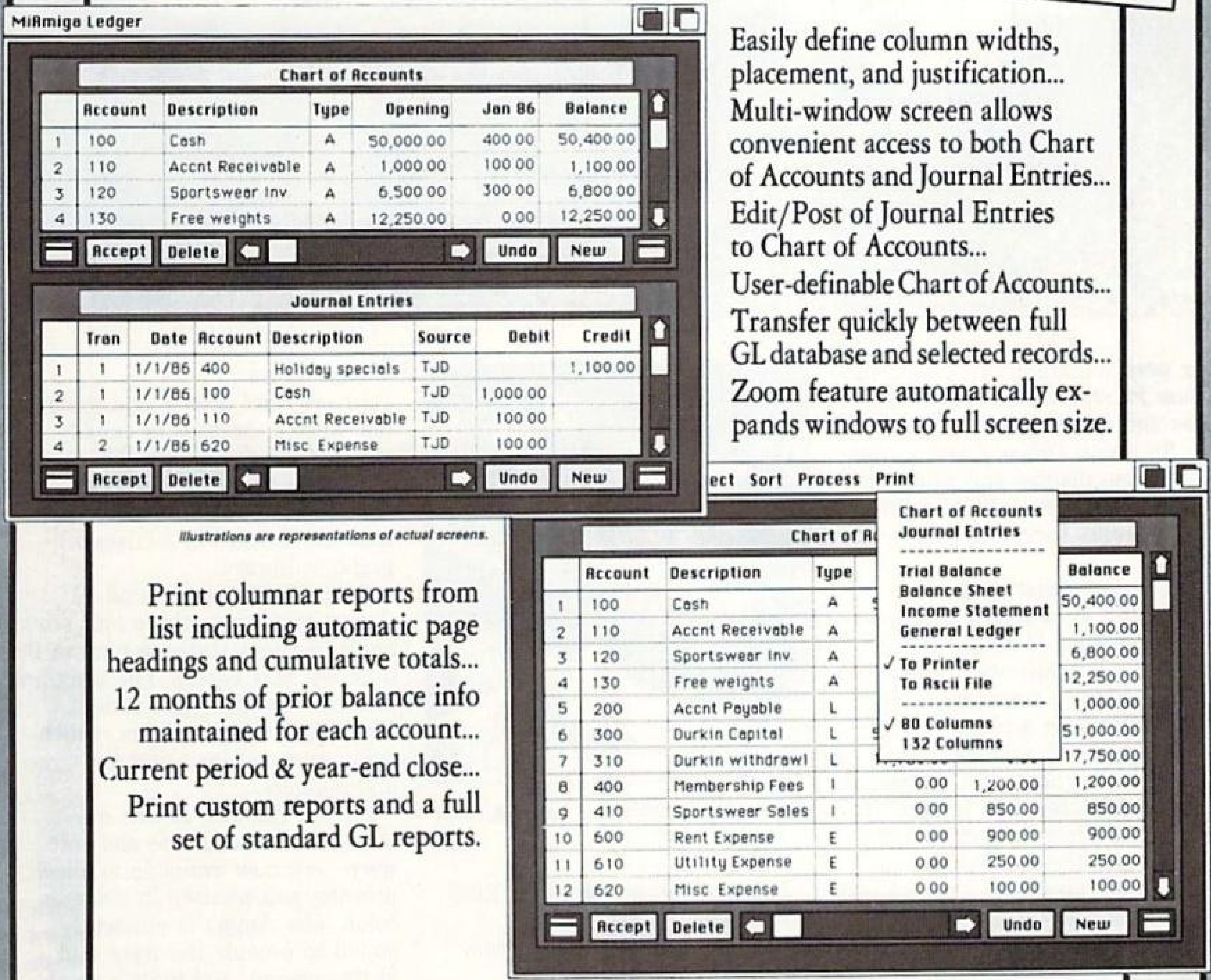

MiAmiga Ledger

Chart of Accounts

	Account	Description	Type	Opening	Jan 86	Balance
1	100	Cash	A	50,000.00	400.00	50,400.00
2	110	Accnt Receivable	A	1,000.00	100.00	1,100.00
3	120	Sportswear Inv	A	6,500.00	300.00	6,800.00
4	130	Free weights	A	12,250.00	0.00	12,250.00

Journal Entries

	Tran	Date	Account	Description	Source	Debit	Credit
1	1	1/1/86	400	Holiday specials	TJD		1,100.00
2	1	1/1/86	100	Cash	TJD	1,000.00	
3	1	1/1/86	110	Accnt Receivable	TJD	100.00	
4	2	1/1/86	620	Misc. Expense	TJD	100.00	

Chart of Ac

	Account	Description	Type			Balance
1	100	Cash	A			50,400.00
2	110	Accnt Receivable	A			1,100.00
3	120	Sportswear Inv.	A			6,800.00
4	130	Free weights	A			12,250.00
5	200	Accnt Payable	L			1,000.00
6	300	Durkin Capital	L			51,000.00
7	310	Durkin withdrawl	L			17,750.00
8	400	Membership Fees	I	0.00	1,200.00	1,200.00
9	410	Sportswear Sales	I	0.00	850.00	850.00
10	600	Rent Expense	E	0.00	900.00	900.00
11	610	Utility Expense	E	0.00	250.00	250.00
12	620	Misc. Expense	E	0.00	100.00	100.00

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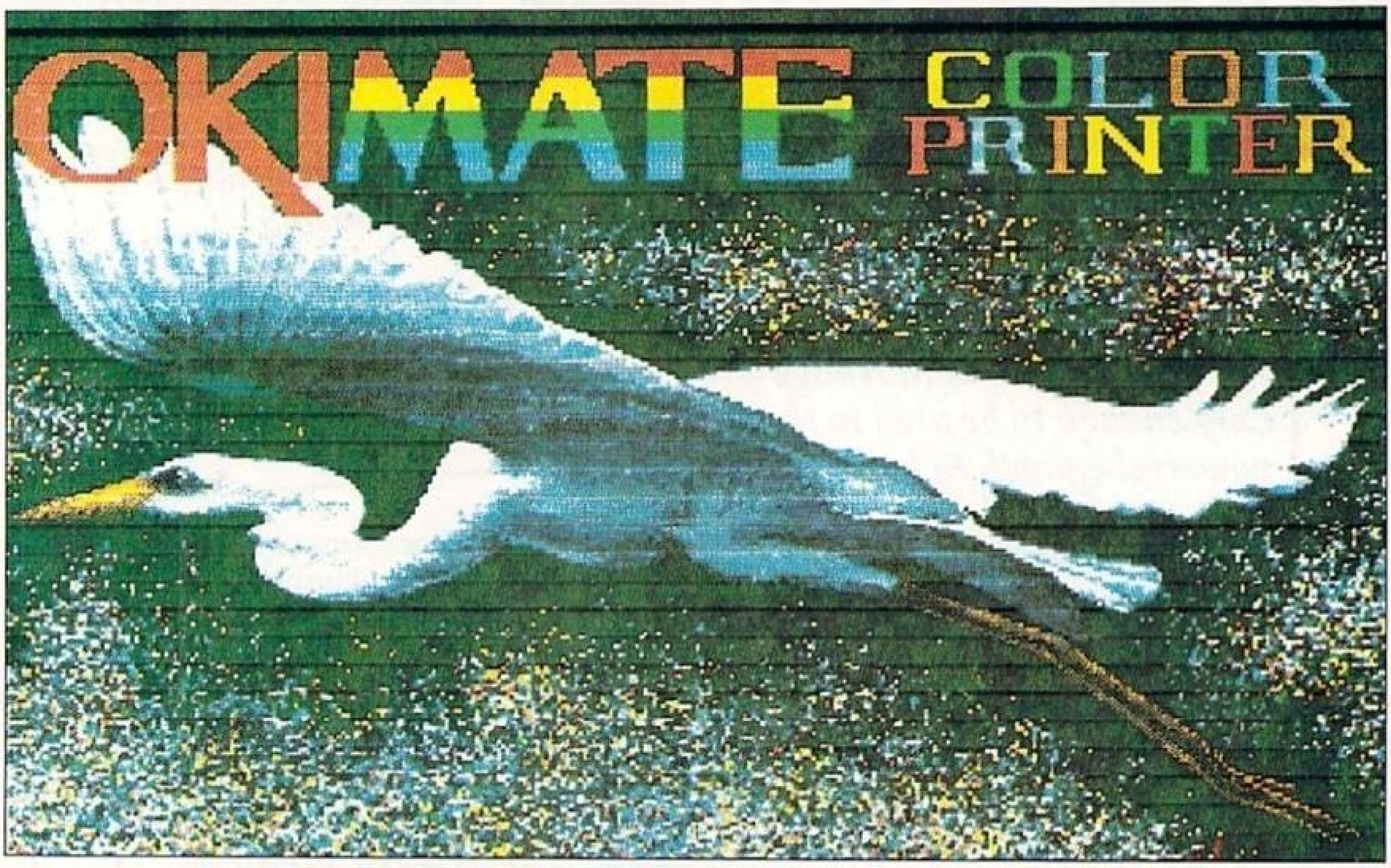

four personal creativity programs: *Deluxe Paint, Deluxe Print, Deluxe Video* and *Deluxe Music Construction Set*. With *Deluxe Paint*, a user can design, display and print pictures that use the full capabilities of the Amiga special graphics chip.

The *Deluxe Paint* program comes with an assortment of options, including Magnification and Grid. The Magnification feature allows a user to simultaneously see and work on a picture at close-up and normal ranges, and Grid is used when precise spacing is essential. Users can turn on the Grid feature for exact drawings, such as architectural designs or precise diagrams.

In addition to these features, the user can also use any piece of a painting as a brush. That means, for example, a piece of one painting could be merged into another painting, or a paint brush could be designed in any shape the user required.

Deluxe Paint is extremely useful for art directors, graphic designers, hobbyists and businesspeople who require high-quality graphics.

The Xerox 4020 Color Ink Jet from Xerox.

Deluxe Print, according to Electronic Arts, is the first full-function color printing program specifically designed for the Amiga.

Deluxe Print gives the user control over both text and graphic images. The program allows the user to place an unlimited number of different images anywhere on a page; edit them; flip, shrink or expand the images; or change their colors using the full range of Amiga colors.

Deluxe Print uses a grid system that allows the user to equally space images and text. The program also includes a graphic editor that enables the user to create and save images in a custom graphics library.

Deluxe Print supports all 11 Amiga fonts, plus three font sizes and three font styles (a total of 99 different text types). The program includes two complete sets of large alphabet characters, which print smooth-edged text for signs and banners.

As you can see, all the elements—both hardware and software—are now available to allow printing and plotting in glorious color. The Amiga is eminently suited to provide the front end of the system, and today's printers and plotters are easy to use and provide quality output. All we need now is a printer that prints *moving* pictures in full color.

—Michael Meyers

The author is a free lance writer and advertising copy writer from Philadelphia, Pa.

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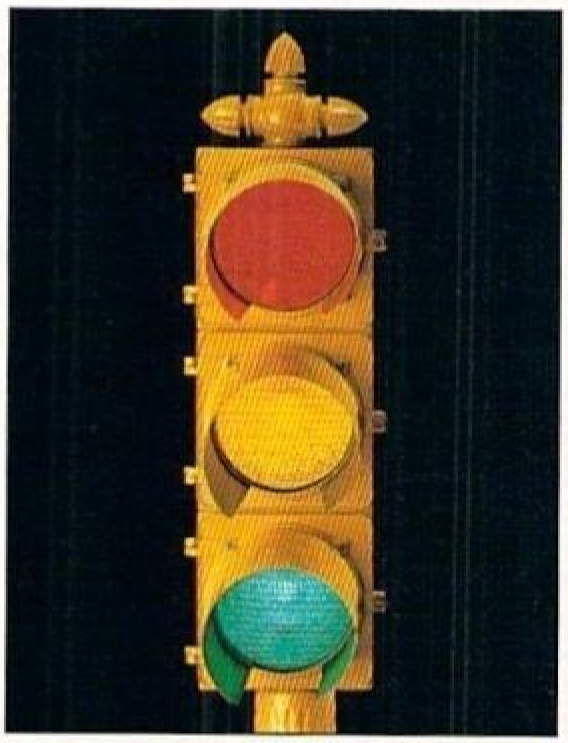
AmigaDOS: An Efficient Control System

Why should Amiga users concern themselves with AmigaDOS, the computer's Disk Operating System? Why bother with typewritten commands and syntax errors when it is much easier to push a mouse across a desk, point to an application and click a button?



Besides, if you don't use Workbench you don't get to work with those fascinating little icons.

There are several good reasons for exploring and using AmigaDOS, such as more commands and applications than you will find in the pull-down menus of the Intuition interface, greater speed of execution and less memory consumed.

Let's talk about the last reason first. It takes a certain amount of memory to create the windows and icons you see when you open a disk such as Workbench. Do away with the icons and the pull-down menus and you've saved yourself several K of RAM, which is important if you're working with a 256K Amiga. The memory you save can be used to run a program or an application that might otherwise not run.

Speed is another consideration. Without the necessity of refreshing screen memory to display icons and pull-down menus, any application running under AmigaDOS will execute faster than the same application running under Intuition.

A second speed gain is the ability to create a RAMdisk, a defined area of memory set aside and used for holding an application or an entire program. This memory area is write-protected. You cannot accidentally corrupt whatever is held there, and it acts as a disk drive in all respects but one. When a program must be called up from a true disk, there is a brief delay—accompanied by the sound of your drive—until the application is loaded into memory. Without the mechanical moves of a physical disk drive, the transfer from RAM is entirely electronic and happens very fast.

The third area of difference between AmigaDOS and Intuition is the extra commands supported by DOS, such as:

Install—which allows you to make a formatted disk bootable,

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A TERM

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- "SPEAK ON" allows the in coming data to be spoken thru the speaker of the AMEGA.
- "PRINT ON" allows data to be printed as it's coming over the line
- You may also change the parameters while on line
- Protocols include (x-modem text, x-modem binary VT-100)
- Also many other features not found in other more expensive terminal packages

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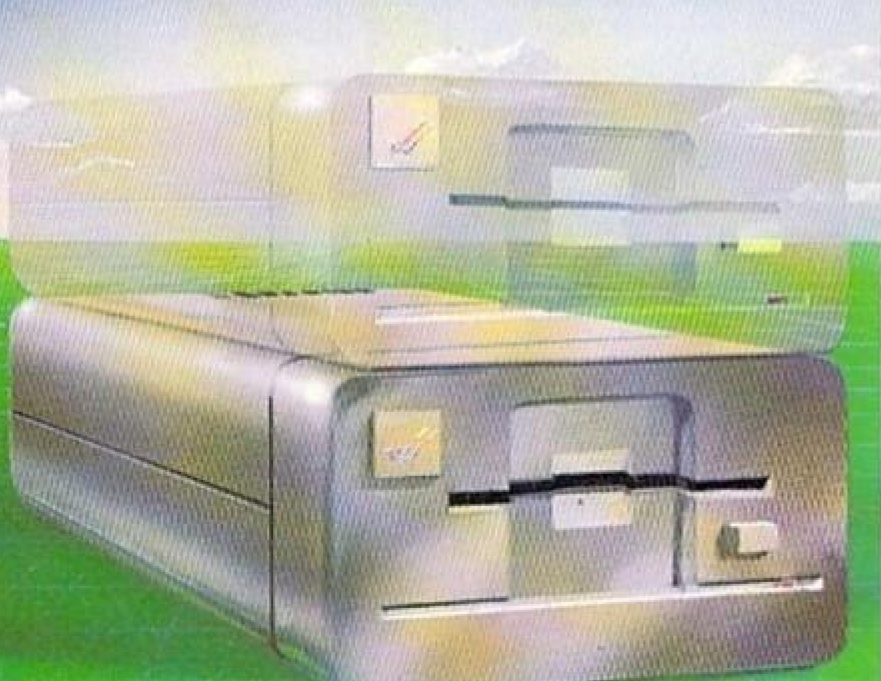

Tired of Swapping?

A DISK

This is a "2-drive" emulator for your Amiga computer that lets you load and run programs without continually "swapping" your workbench disk in and out. It is intended for those using an Amiga with a single drive who are tired of constantly changing from your program disk to a workbench disk in order to run a program.

Your "A Disk" is a system disk that reconfigures your system to fool it into thinking that you have two drives on your system: one drive for your workbench and one drive for your program disk.

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without the necessity of going through Workbench or creating a CLI disk. CLI (Command Line Interface) is the method used to access and control AmigaDOS.

DIR—allows you to look at the directory of a disk in greater detail than you would have by simply opening the disk and examining the icons in the window.

LIST—gives even more information about files, including the date created, bytes used and whether the file is protected.

PROTECT—allows you to prevent a file from being accidentally deleted.

TYPE—prints a text file to the screen.

ASSIGN—tells AmigaDOS where to look for certain files or applications.

You may also use the commands found on the pull-down menus of Workbench, such as Initialize (Format), Rename (Relabel) and Duplicate (Diskcopy). You may also use Preferences.

There are many more AmigaDOS commands, but they are outside the scope of this introduction. When you are ready to pursue the subject further, buy a copy of *The AmigaDOS Manual,* published by Bantam Books. It's $24.95, available in better bookstores and well worth the money.

Commands in AmigaDOS cannot only be used separately, they can be combined into what is called a batch file or executable file, where commands and arguments are put into list form and executed automatically in order.

An example of such a file can be found on the Workbench disk in directory S. To see it, use this command: **TYPE S/STARTUP-SEQUENCE**. The S tells AmigaDOS which of several directories on the disk to go to, and STARTUP-SEQUENCE is the label of the file to be accessed.

A sequence of commands is called a Path. If the file you wish to access is on another disk, the Pathname may also contain directions to that disk, such as **TYPE DF1: S/STARTUP-SEQUENCE**. The batch file has printed to your monitor screen and you should see this:

ECHO—a command that prints messages to the screen.

LOADWB—a command to load Workbench.

ENDCLI—the command to close the CLI window.

>**nil**—a directional symbol that, in this case, tells AmigaDOS where to write the output of the ENDCLI command. Since the symbol is followed by nil, the output goes into limbo and we do not see a message telling us that the CLI window has been closed. Instead, we are shown the Workbench.

The implication here is that Workbench is a CLI disk, controlled by AmigaDOS, that uses a start-up batch file to render AmigaDOS and CLI invisible and present the Workbench-Intuition tools. From Workbench we can use Preferences to activate CLI, open the systems drawer, click on the CLI symbol and be presented with a window in which we can utilize AmigaDOS.

As with other windows opened under Intuition, the CLI window can be moved and resized. You'll notice that the prompt is 1>. Should you wish to open another such window, use the command NEWCLI where you see the prompt 2>. The numbered prompts help you keep things straight. They are not so much window numbers as they are task numbers. As soon as you open your second window, you've begun multitasking.

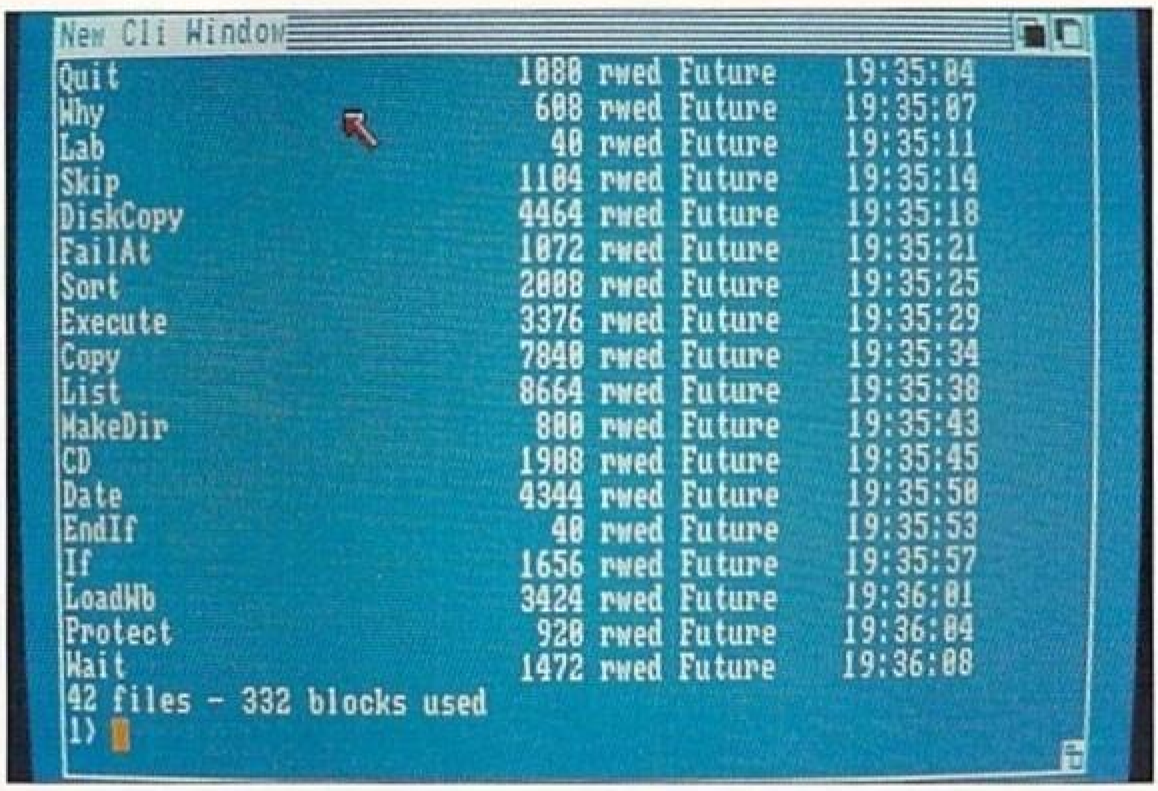
Although you can work in only one window at a time (activated by clicking the mouse button when the pointer is in the correct window), it is possible and very easy to have each of several windows working on separate tasks.

For comparison purposes, you could use the first CLI window to list the directory of the disk in the internal drive (DFO:) and the second window to list the directory of the disk in the external drive (DF1:)

Once a CLI window is open, you can close all other windows relating to Workbench. The savings in RAM begins immediately.

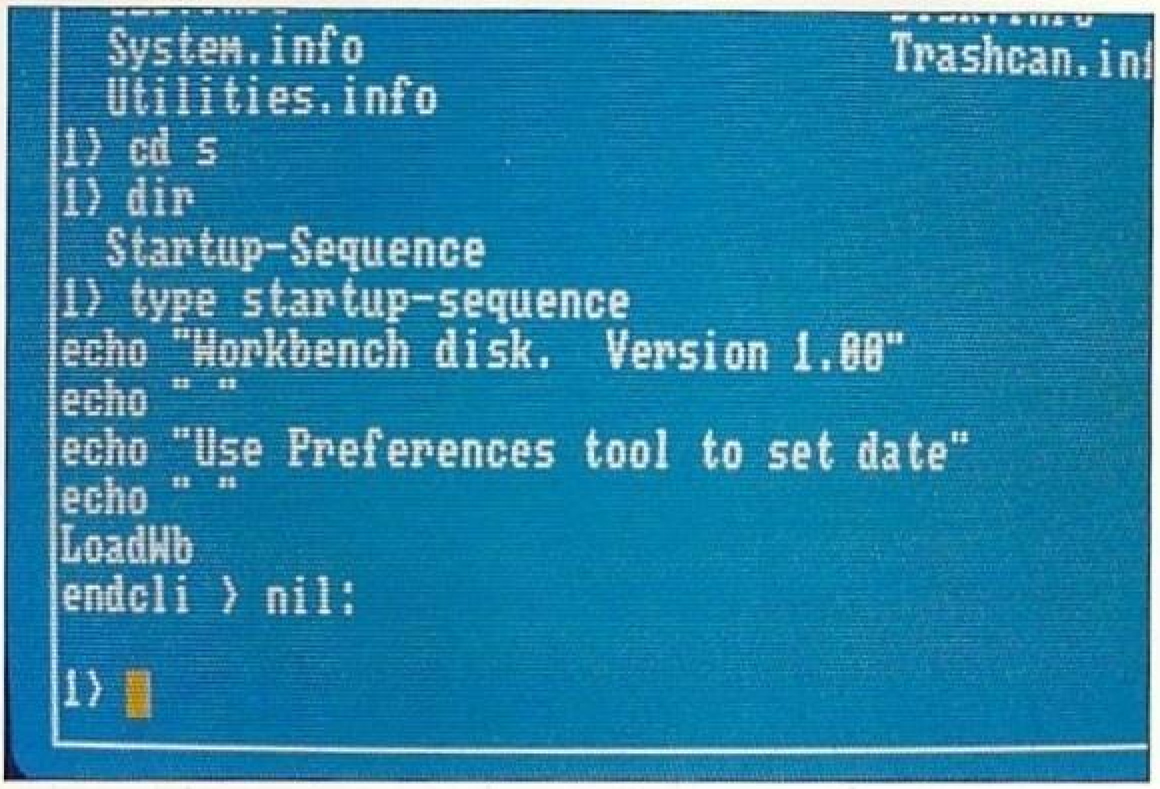
With the RAM you've saved, you can create a RAMdisk. In fact, you don't really create it. It's there, at least potentially, in the form of a logical device that's ready to be activated by using "RAM:" as part of a command or argument. The colon following the word RAM is important. Just as DFO: specifies the internal Amiga drive, RAM: tells AmigaDOS you're referring to the virtual drive, not just talking shop.

To activate the RAMdisk, give



```
Quit                    1000 rwed Future     19:35:04
Why                      608 rwed Future     19:35:07
Lab                       40 rwed Future     19:35:11
Skip                    1104 rwed Future     19:35:14
DiskCopy                4464 rwed Future     19:35:18
FailAt                  1072 rwed Future     19:35:21
Sort                    2008 rwed Future     19:35:25
Execute                 3376 rwed Future     19:35:29
Copy                    7840 rwed Future     19:35:34
List                    8664 rwed Future     19:35:38
MakeDir                  800 rwed Future     19:35:43
CD                      1908 rwed Future     19:35:45
Date                    4344 rwed Future     19:35:50
EndIf                     40 rwed Future     19:35:53
If                      1656 rwed Future     19:35:57
LoadWb                  3424 rwed Future     19:36:01
Protect                  920 rwed Future     19:36:04
Wait                    1472 rwed Future     19:36:08
42 files - 332 blocks used
1>
```

Results of LIST command on C subdirectory.



```
  System.info                                   Trashcan.in
  Utilities.info
1> cd s
1> dir
  Startup-Sequence
1> type startup-sequence
echo "Workbench disk.  Version 1.00"
echo " "
echo "Use Preferences tool to set date"
echo " "
LoadWb
endcli > nil:

1> 
```

Start-up sequence of Workbench disk; a batch file that may be modified as required.

it something to do. As an example, you could type **COPY FORMAT to RAM:**. On the next line, type **ASSIGN FORMAT RAM:FORMAT**. The first command makes the transfer from real disk to RAMdisk; the second tells AmigaDOS where to look for that file when it is next called upon.

The RAMdisk is elastic. Unlike PC-DOS, where a certain amount of memory must be allocated to the creation of a RAMdisk and forever lost to the balance of the operating system, AmigaDOS allocates only as much memory as is needed to hold the files or applications you transfer to the RAMdisk. With PC-DOS, if you allocate 64K to the RAMdisk and your file consumes only 10K you are still down by 64K; with AmigaDOS you are only down by 10K.

RAMdisk size is limited only by the amount of memory in your Amiga. It is possible, for instance, to put the entire C directory into a RAMdisk, speeding up your work under CLI because the execution of a command will not necessitate accessing the physical disk drive.

You should be aware, however, that RAM is dynamic memory. It exists only while it is supplied with power. Once you turn off your computer, the contents of RAM—and that includes your RAMdisk—are lost. Any files that have been altered should be saved to a physical disk before powering down. Do this with the command sequence **COPY FROM RAM:(filename) TO DFO:** (or DF1:)(filename).

Once you have the C directory successfully copied into a RAMdisk, you can begin whizzing along with your Amiga. After the computer is powered down, to go back to what you were doing you must go through the copying process all over again.

You can make the computer do this for you automatically when you first boot the disk by simply adding a few lines to the STARTUP-SEQUENCE batch file. In order to do that, however, we have to take a look at another AmigaDOS application that runs under CLI but not under Workbench: ED (edit).

ED is a screen editor for use with CLI. It allows full cursor movement over the screen and provides a few word processing features, such as insertion or deletion of text. ED's purpose is to allow you to type on screen and to revise or change as necessary.

In our example, you would use the command **ED S/STARTUP-SEQUENCE**. Again, the file will print to the screen. You now have the ability to change it as you wish.

To create a CLI-to-RAM file, delete the LOADWB command. In its place, type:

MAKEDIR ram:c. This activates RAM: and creates a directory. Next type:

COPY sys:c to RAM:c. This copies the contents of the C directory. On the next line, type:

ASSIGN c: RAM:c. This tells your computer to look for c in RAM:. Delete the ENDCLI command and the >nil command and your start-up file is done. Save it to disk by pressing Escape X.

Thereafter, when Kickstart gives you the Workbench prompt, insert your CLI disk. The start-up sequence file will read all the CLI files from the physical disk and transfer them to the RAMdisk. You'll see proof of this happening on screen. If you'd rather not witness this, add the command QUIET to the COPY line: **COPY sys:c TO ram:c QUIET**.

In using the ED application, movements around the screen are by way of the cursor keys, a logical way of doing things. Other commands you will encounter here are:

ESC D—to delete the line currently holding the cursor.

ESC I—when followed by text, inserts the text line above the cursor.

ESC A—inserts a text line after the cursor.

ESC J—joins two lines together.

ESC T—sends the cursor to the top of the file.

ESC B—sends the cursor to the bottom of the file.

ESC Q—ends your involvement with ED, without saving any changes you've made.

ESC X—saves changes and returns you to CLI.

While it's possible to use ED as a rudimentary word processor, we recommend it only for short notes. To create a new file with ED, you must first assign a filename. Then type: **ED (filename)**. If after creating and saving such a file you wish to print it, the command is: **(filename) > PRT**.

Within AmigaDOS there is also a line processor called EDIT. Frankly, dedicated word processors such as *Textcraft* and *Scribble* are much easier to use.

Although you can set the date and time in Preferences from the Workbench window, you probably won't want to go there if you're heavily involved in AmigaDOS, especially if you've bypassed Workbench by creating the CLI disk described above.

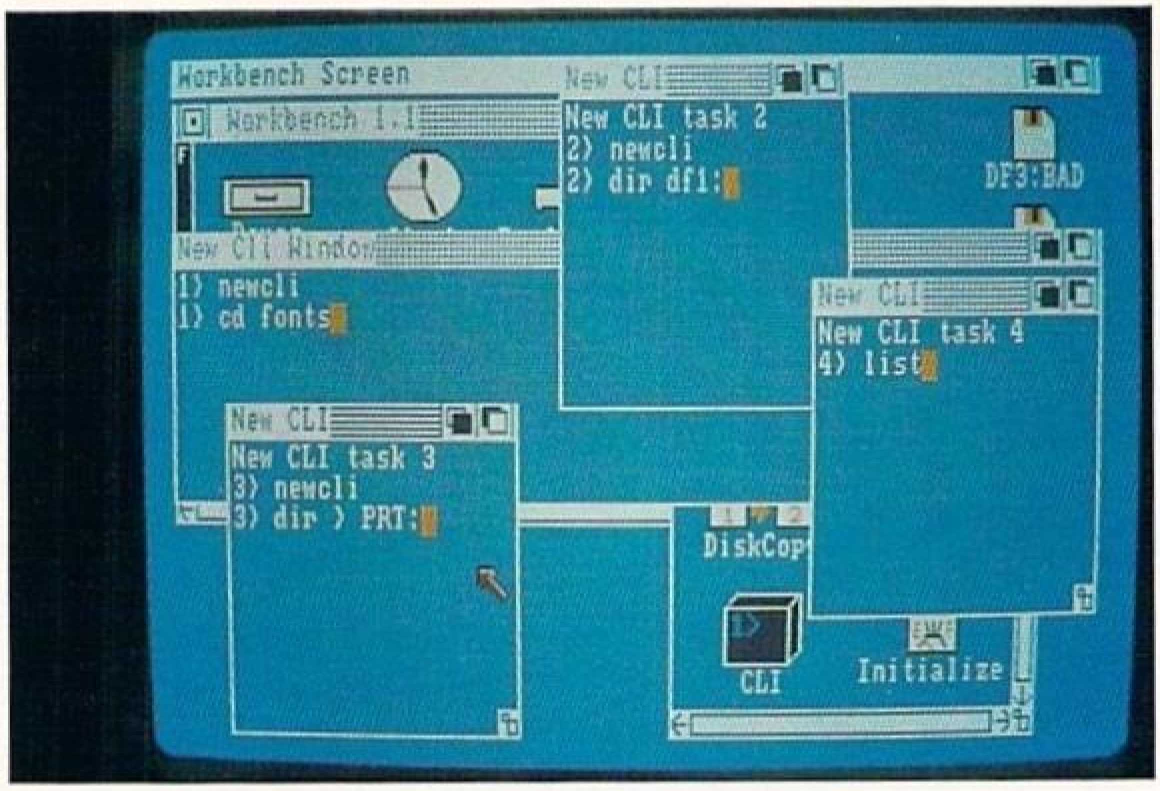
The DATE command allows you to do this under CLI and the format is simple: **DATE (dd-mmm-yy)**. Enter the day first, then the month, then the year. To set the time, the format is **DATE (hh:mm)**. This format is based on a 24-hour clock.

Using DATE at the outset of an AmigaDOS session causes any files you created and saved to be stamped with that date and time. This is helpful to those of us who may have more than one version of a file that has gone through various revisions, since the latest revision would have the latest date. This is also one of the bits of information that will be displayed when you use the LIST command.

You may use the LIST command to display files on the current disk in use, to display files on a disk in an exterior drive or to display only the files in a directory.

LIST also tells you the size of a file and whether a particular name refers to a file or a directory. It displays a column called rwed—Read, Write, Execute, Delete. These are products of the PROTECT command. The presence of an initial after a file indicates action can be performed on that file; the absence of an initial means the file is protected.

Files and directories under AmigaDOS need not be complicated. Think of them as a family tree. Directories are the first generation of the family; subdirectories the second; files the third.



```
1) newcli
1) cd fonts
```

```
New CLI task 2
2) newcli
2) dir df1:
```

```
New CLI task 3
3) newcli
3) dir > PRT:
```

```
New CLI task 4
4) list
```

Multi-tasking with CLI. Each CLI window is prepared to handle a different task.

Files are the smallest part of a directory.

You've been dealing with these items on Workbench all along, perhaps without knowing it. Workbench is a directory; the Utilities drawer is a subdirectory. Within the Utilities drawer are the Notepad and Calculator. They are files or, in this case, applications. If you can manipulate files and directories with a mouse and pointer, you can also do it through CLI and AmigaDOS.

You may have several directories on a disk, as you do on the Workbench disk. These are always specified by the suffix (dir). To go from one to another in AmigaDOS, use the command CD (Current Directory) and specify the name of the directory you want to make current, as in CD S to get into the S subdirectory.

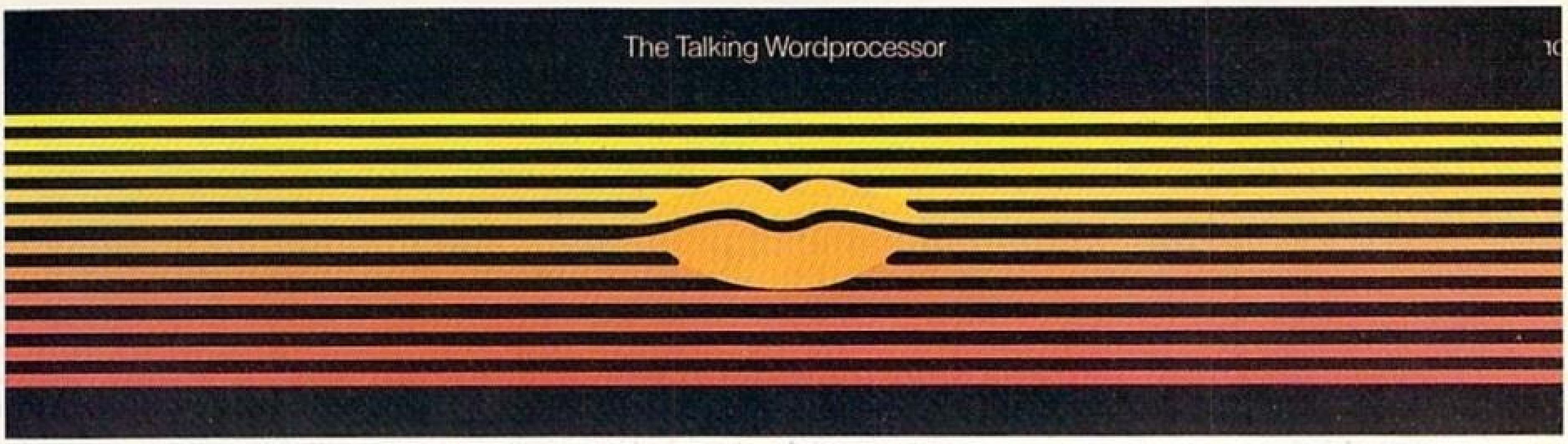
Once there, you can use the DIR or LIST commands to examine the files or subdirectories contained there. If you already know which files are there and which one you wish to access, your command would be **CD S/STARTUP-SEQUENCE**. You changed to the S directory and immediately went into the file labeled Startup-Sequence.

To return to the root directory (the first generation), simply type CD:. If you forget where your DOS meanderings have taken you, typing the CD command will cause AmigaDOS to print the identification of the current directory.

You may notice that the above process happened much faster than if you had slid the pointer to an icon, opened it with a double click, slid the mouse again and then clicked on a drawer icon. That's why AmigaDOS is fast and why we say there is more to it than meets the eye. As you work with AmigaDOS, you'll see that blinding speed you were told about when you purchased your Amiga.

If you've learned that AmigaDOS commands are simple and logical. If you've learned a few basic applications and, mostly, that DOS is not an arcane science, then the next step is to click on the CLI icon and dive in. The rewards are in the form of speed, memory and, perhaps, discovering a few things you didn't know your Amiga could do.

—Ervin Bobo



Talking Word Processor

Talker does everything you'd expect from a full-featured word processor, plus Talker does just that—talks. It reads your text, word-for-word or letter-by-letter.

So, Talker is great for proofreading, learning to type and the sight impaired.

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Bring your words to life with Talker.

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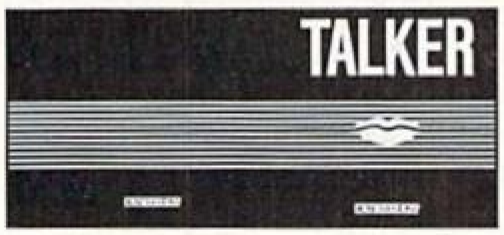

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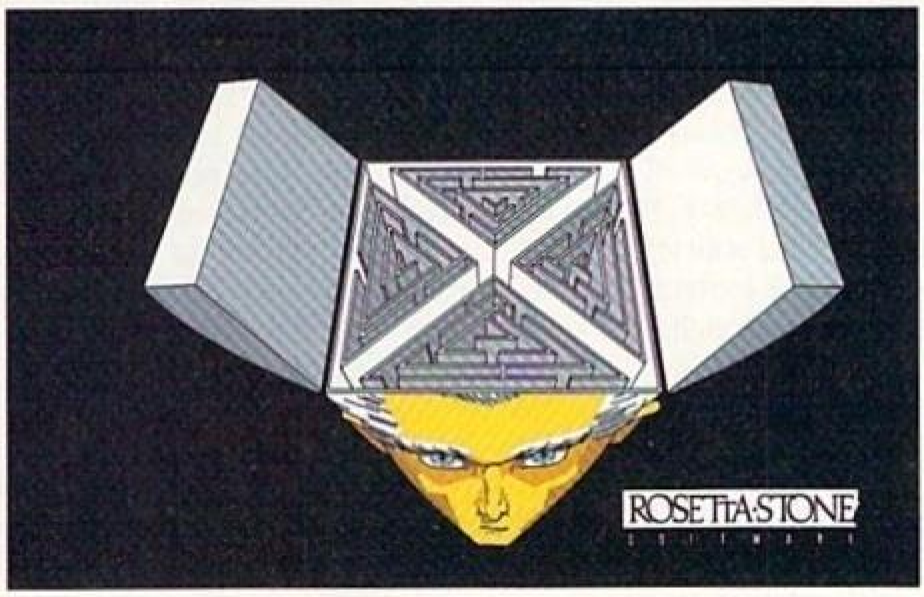

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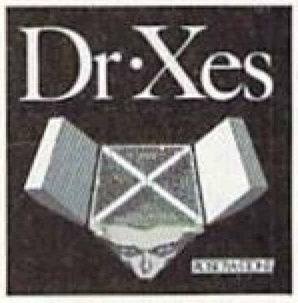

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Aprotek Printers

Daisy-wheel and dot-matrix printers

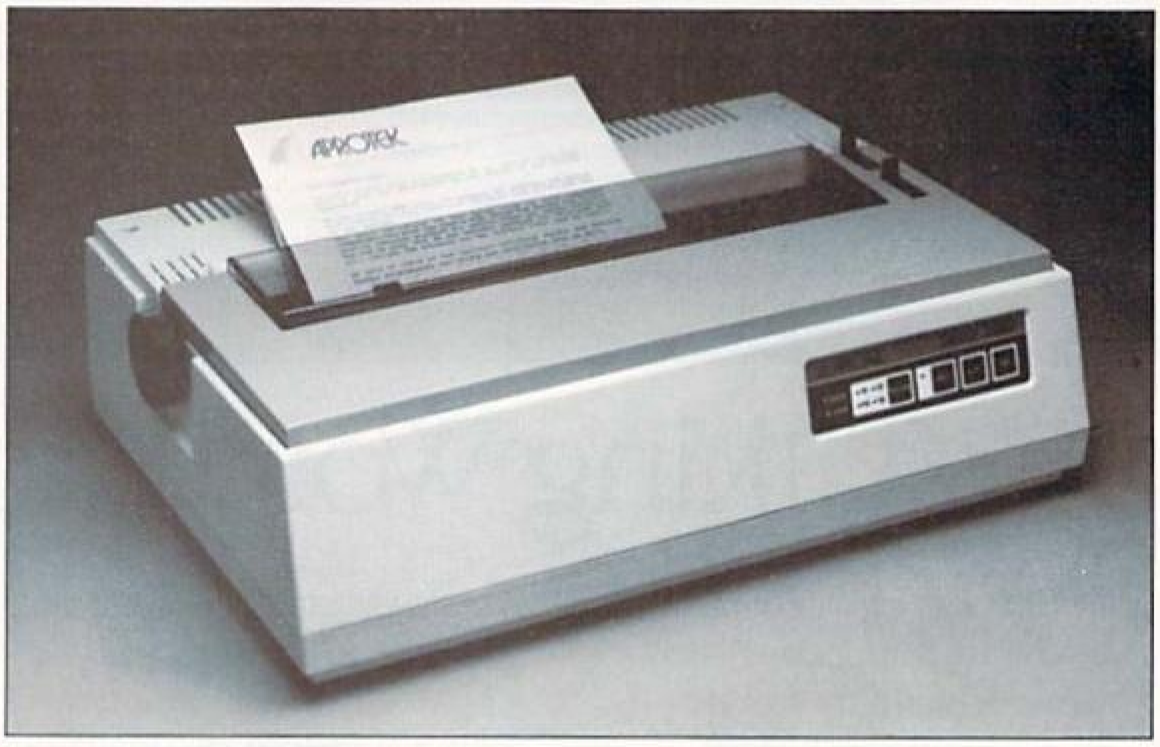
The new Aprotek Daisy 1120 printer and the Seikosha SP-1000A printer are sensible products that produce quality printouts.

The Aprotek Daisy printer is a feature-rich 20-character-per-second (cps) machine that uses the standard 96-character, Diablo-type print wheel with a special ridge-back feature. This feature, according to the manufacturer, provides the most accurate positioning for the characters on paper.

The printer has a front control panel with LED-lit function switches, including power, alarm, pitch, select mode (SEL), line feed (LF) and top of form (TOF). The alarm lamp lights and the alarm sounds for half a second when the printer is out of paper or out of ribbon. The pitch switch delegates either proportional spacing (PS) or one of 10, 12 and 15 characters per inch (CPI) to be used. The manufacturer notes that when using the PS mode, it is best to also use the 12 CPI to make printouts.

The SEL switch determines whether the printer is in selected or deselected mode. When the SEL lamp is lit, the selected mode is on and printing can take place. When the SEL lamp is off, the deselected mode is on and then the pitch, LF and TOF switches can be operated. The LF switch when depressed results in a 1/6-inch vertical advance of the paper. When the TOF switch is pressed, the printer memorizes the position that it's in. A second press of the switch allows the printer to advance to the next TOF position.

The Aprotek Daisy printer comes with such special features as international character selection, paper-length setting, auto-line-feed selection and low-speed-mode selection. These features are all controlled with a row of DIP switches located on the back of the machine.



Aprotek Daisy 1120 Printer from Aprotek

The next set of features includes baud rate selection, protocol selection, stop-bit length, parity selection, odd/even parity selection, data length selection and interface selection. These are controlled with a second row of DIP switches located beneath the other. The manual gives a brief description and detailed instructions on how to set these switches for the desired modes.

The printer has a self-test printing function that gives the user a printout of its 96 available characters. This can aid in checking print quality and the printer mechanism, and the printer need not be connected to a computer to run this check.

Also in the manual is a complete list of standard control codes and escape (ESC) control codes with an explanation of each. The ESC codes are described in the manual appendices. They include auto underscore, double-strike print, bold print, horizontal tab setting, auto centering, horizontal spacing, pitch setting, absolute horizontal and vertical tab setting, line-feed spacing, pitch setting, graphics mode and vertical tab setting.

In all, the Aprotek Daisy is a fine, reasonably priced printer with many advanced features. It produces excellent printouts that will meet the most demanding requirements.

The Seikosha SP-1000A is another fine printer in the matrix printer market. The manufacturer states that one valuable characteristic of this printer is its ability to print high-quality print in very small dot size. As the manufacturer reminds us, the SP-1000 printer line was developed to emulate certain well-known printer brands, which means that the SP-1000 line should be compatible with almost all available software.

The SP-1000A comes with an easy-to-read manual complete with diagrams and pictures to facilitate learning its many functions. The control panel has four switches: on-line, near-letter-quality (NLQ), form feed (FF) and line feed. The printer's on-line switch, NLQ switch, paper-out indicator and power indicator all have LEDs that light when their corresponding functions are in use.

The printer has margin settings

that are set using these switches. Depressing the on-line switch for longer than one second causes the margin setting to engage. By depressing the LF switch, the margin is shifted to the right. By depressing the FF switch, the margin is shifted to the left.

The SP-1000A also comes with a self-test printing function, an automatic paper-loading function, an automatic printing function and a hexadecimal dump-list function. Each of these special features is explained in detail in the manual.

The user is also able to operate other special functions: bold print, double-strike print, graphic print, line-feed spacing, page-length setting, horizontal tab setting, margin setting, underlining, buffer clear, skip-over perforation, unidirectional printing, language-fonts setting, input data control and print-code area designation. All of these, plus others, are explained in the manual in detail.

The manual also provides four separate appendices for certain subjects that deal with character specifications, categories and sets and control codes.

Printout quality in the NLQ mode is excellent. The standard mode is comparable to most popular matrix printers.

Overall, the Seikosha SP-1000A is a cost-effective, quality matrix printer that will meet the printing needs of the average computer user.

—Eric Tenbus

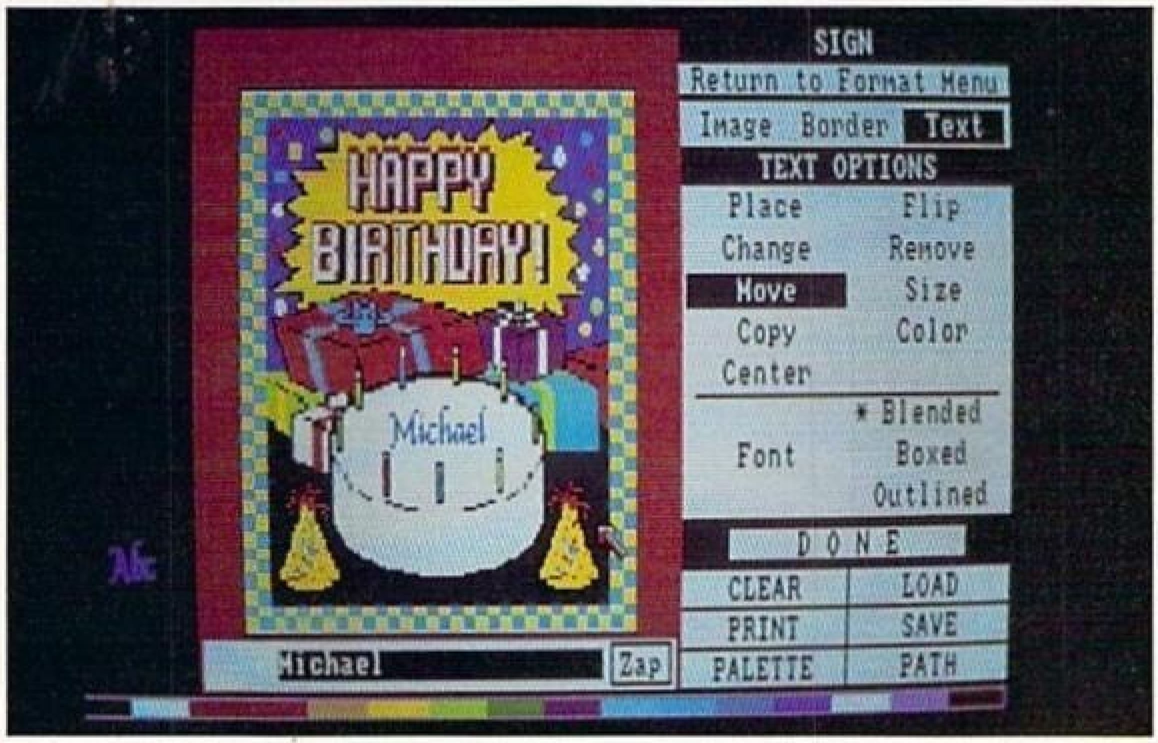
$319.95 retail; Aprotek Daisy 1120
$239.95 retail; Seikosha SP-1000A
Aprotek; 1071-A Avenida Acaso;
Camarillo, Calif. 93010;
805-987-2454

Deluxe Print

Printing program

512K Amiga.

By now, every Amiga owner and would-be Amiga owner knows that Electronic Arts has promised a *Print Shop*-type program that will print in color. Well, if you haven't yet used *Deluxe Print*, you're in for a revelation.



***Deluxe Print* from Electronic Arts**

Deluxe Print prints signs, banners, letterheads and greeting cards. It also prints calendars, mailing labels, wrapping paper and more. It's not *Deluxe Print*'s extras or even its preview feature that sets it apart from all other programs of this type. It is how you arrive at the finished product.

Booting after Kickstart, *Deluxe Print* gives you a familiar Workbench window, complete with a Preferences icon that helps you properly set the system for the type of printer you are using. Though the program supports the Okimate 20, Epson JX-80 and HP Colorjet printers, it does equally well with black-and-white printers.

After viewing *Deluxe Print*'s title screen, created with the award-winning *Deluxe Paint*, you're presented with the first of many menu screens. The left half of your screen shows a work slate, and the right half offers choices as to the type of printing you wish to do—sign, banner, calendar, etc.

Using the mouse, click on the appropriate label and the entire screen changes. The right side is still a menu, though a different one, and the left half is still a slate, now blanked and changed to reflect the dimensions of what you've chosen to create. This, whether it be a sign, label, greeting card or whatever, is known as a Format. Formats can be changed prior to printing. If you start with a sign that you wish to change to the dimensions of a bookmark, you may.

At the top of the menu are three broad categories: Images, Borders, Text. You will be working with these categories in all you do and, unlike other programs, they can be used in any order.

Click first on Images, then on Select. A directory appears, each entry consisting of several graphic representations. Choose an entry and the choices appear on your slate; click on the image you want to use and you go back to the Create menu. Your slate is still blank and your selected image appears in the lower left corner of the screen.

Now click on Place, then move your cursor to the appropriate spot on the slate and click again. As the image appears, you realize you have a continuing preview,

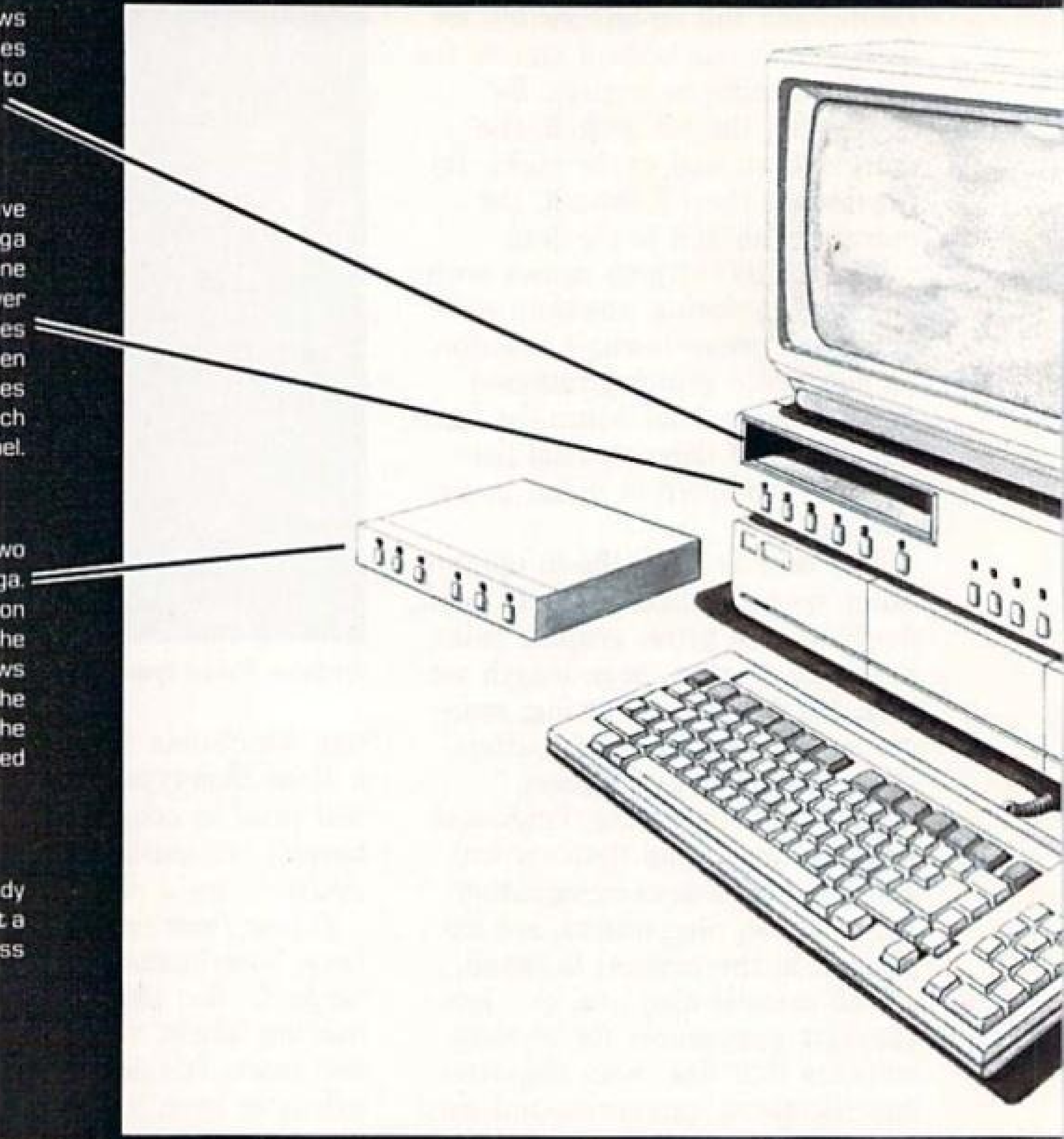
ALL

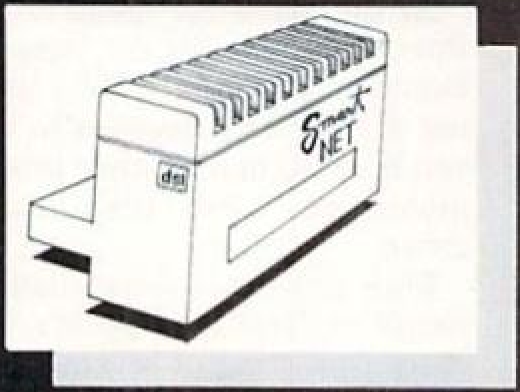
The Buss Station comes with a recessed slot which allows the user to store his most used/popular program diskettes only a fingertip away! The recessed slot can be removed to provide room for the optional DSI "Associate".

A surge, spike, RFI, and EMI interference suppressed, five outlet power control center which allows the Amiga computer, and four peripheral devices to be plugged into one fully protected power source. The front panel of the power controller section of the Buss Station, houses six switches (one is a master switch), each with an LED which lights when the corresponding switch is in the "on" position. Eliminates messy extension cord cabling, and allows the user to switch on/off his computer and all other peripherals from one panel.

The Associate is a multiport data switch which provides two fully switchable serial and parallel output ports for the Amiga. The front panel of the Associate section of the Buss Station houses six switches, each with an LED which lights when the corresponding switch is in the "on" position. The Amiga allows the use of only one serial and parallel device, however, the Associate increases the utility of the Amiga by allowing the use of up to two serial and parallel devices which are selected and controlled by the flick of a switch.

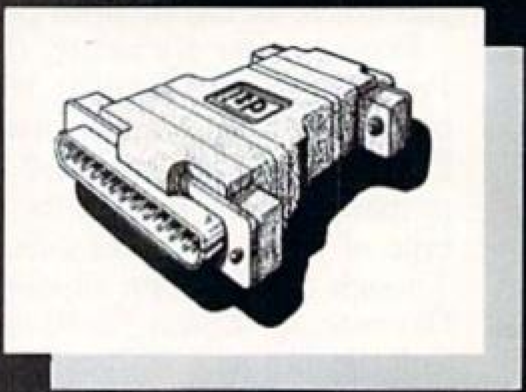
The Buss Station can be ordered with the Associate already installed at our factory or, the Associate can be ordered at a later date and installed at the dealership where the Buss Station was purchased or by the end user at his home.





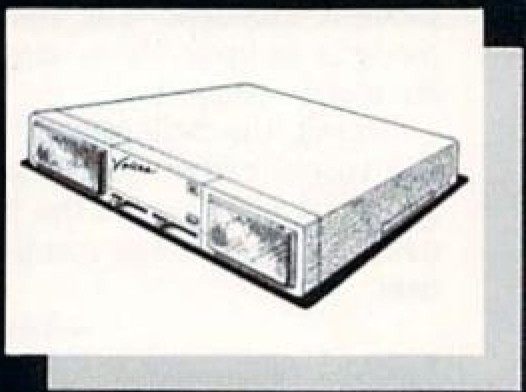
SMARTS

You can give your Amiga Smarts in two different ways. The first method requires a DSI Buss Station, a Smart 1 Ram Expansion Starter Card and up to three Smart 2 Ram Expansion Slave Cards. The second method requires a Smart Net, a Smart 1 Ram Expansion Starter Card and up to three Smart 2 Ram Expansion Slave Cards. The DSI Smart Net is an EMI/RFI shielded metal enclosure which interfaces to the Amiga, provides ports for, and encases the Smart 1 and Smart 2 RAM Expansion Cards. The DSI Smart 1 Ram Expansion Starter Card provides incremental RAM expansion and has the microprocessor circuitry necessary to expand the Amiga to an additional 2 megabytes of RAM. Smart 1 also has an expansion port which allows the user to connect up to three additional Smart 2 Ram Expansion Slave Cards. Each Smart 2 Ram Expansion Slave Card provides up to 2 megabytes of incremental RAM expansion for the Amiga. A combination of one fully loaded Smart 1 Starter Card, and three fully loaded Smart 2 Slave Cards will increase the Amiga's memory to its maximum potential of 8 megabytes. The Smart cards can be ordered with 0k, partially loaded, or fully loaded with 2 megabytes of RAM.



VISIONS

Due to the way the RGB TTL video output circuit of the Amiga was designed, it can properly interface to only a very small percentage of the many RGB TTL monitors on the market today. Visions is a video circuit designed to convert the non-standard RBG TTL video output of the Amiga to a standard IBM PC RGB TTL video output thereby allowing the user to choose from the widest possible variety of monitors available. RGB TTL monitors that can be interfaced to the IBM PC can be interfaced to the Amiga when Visions is used.

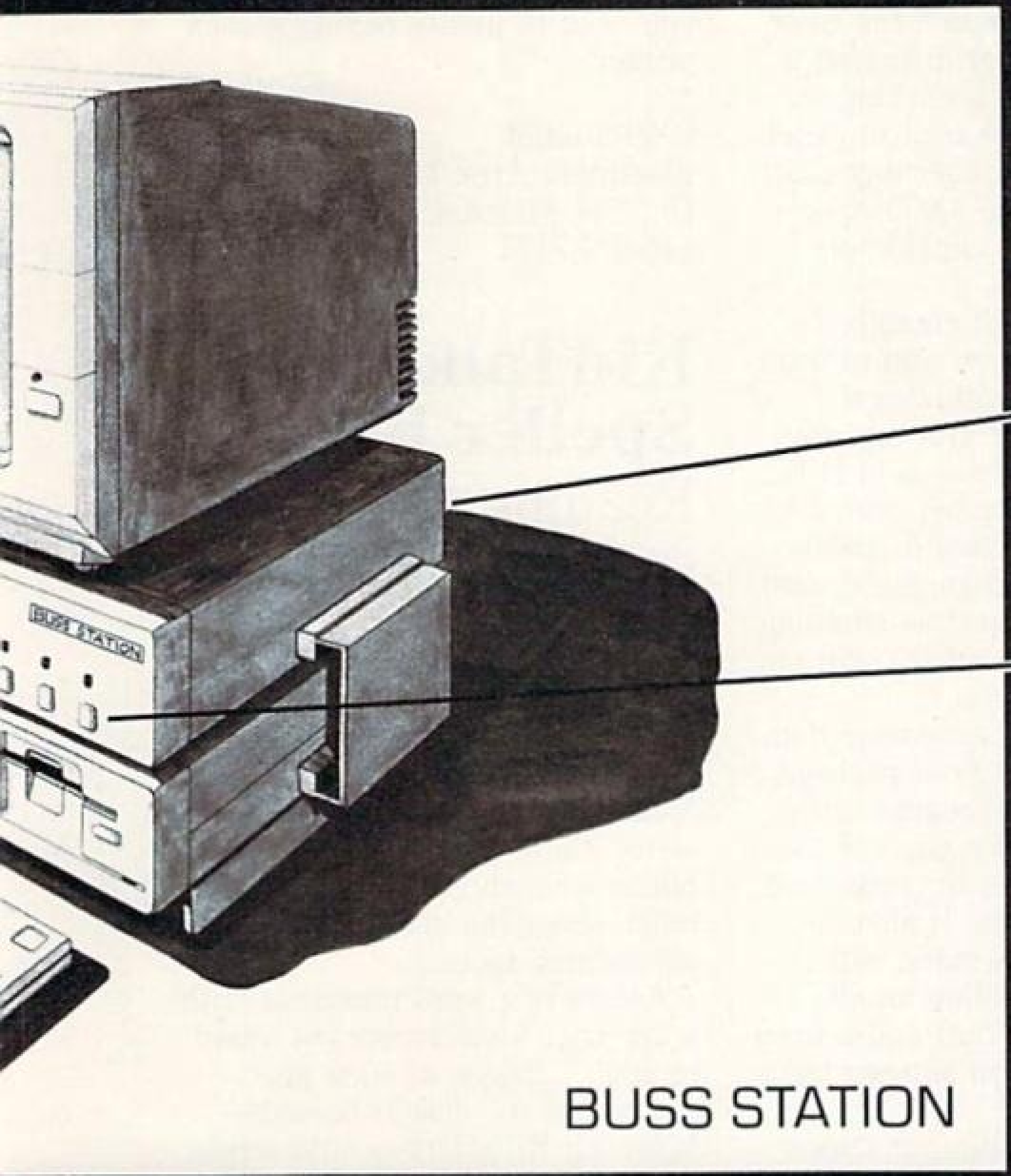


VOICES

Voices is a stereo amplifier with two full range speakers designed to fully utilize the stereo output ability of the Amiga where the use of a home stereo unit is not available or desired. The amplifier and speakers are encased in a low profile/high tech EMI and RFI shielded metal enclosure. Voices provides right and left channel stereo output jacks, which allow the user to connect the Amiga to a home stereo unit if desired and, a headphone jack for situations where quiet or privacy is desired. Voices can be used to provide stereo quality sound for audio and non-audio monitors.

For complete dealer and distributor information concerning the exciting new ine of DSI products please contact your local representative or DSI at the following address:

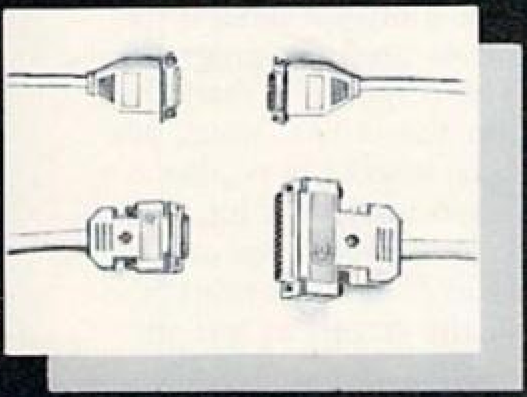
ABOARD



BUSS STATION

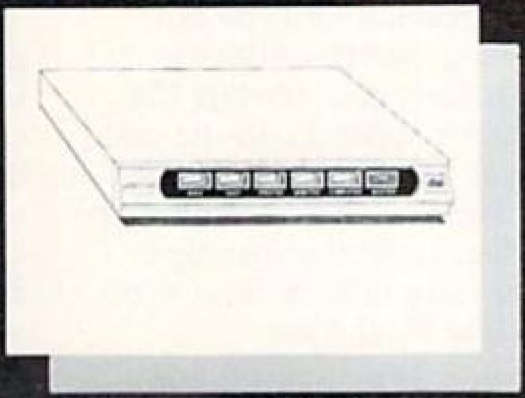
A special RAM expansion port which allows the user to plug in the DSI "Smarts" and incrementally increase the memory of the Amiga to its maximum potential of 8 megabytes.

Eight 86 pin card edge connectors, identical to the one on the Amiga, giving it expandability comparable to the IBM PC. The front panel of the slot expansion section of the Buss Station, houses eight switches, each with an LED which lights when the corresponding switch is in the "on" position.



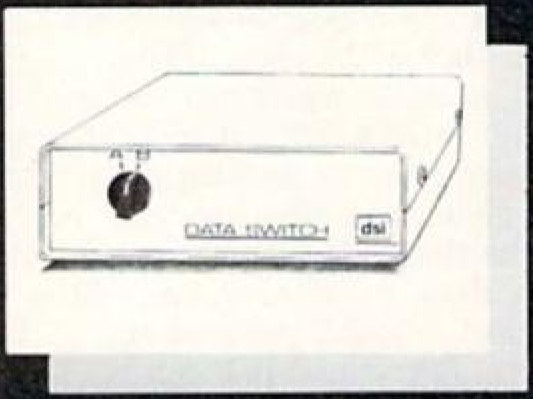
INTEREX SYSTEM
INTERFACE CABLES

The only totally comprehensive program of interface cables for connecting the Amiga to virtually all of the most popular analog RGB or digital RGB TTL color monitors, as well as composite monochrome and color monitors, serial printers and modems, parallel printers, keyboards, disk drives and other peripheral devices.



DIRECTOR

The Director is a surge, spike, RFI, and EMI interference supressed 5 outlet power control center for computers and peripherals.



DATA SWITCH

Six Data Switch models allow port expansion and sharing of computer and peripherals.

dsi

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Wichita, KS 67211-2307
316-264-6118
Telex: 650-193-4977

much like a pasteup, allowing you to see changes and rearrangements without having to wait for a printout. By clicking on Move, you can drag the image anywhere within the slate. You can flip it, copy it, resize it, color it, remove it or even edit it.

When editing, the image expands to fill your slate, and you have at your disposal several simple drawing tools that you can use to make alterations. Once changed, click on Done and go back to your primary slate.

Borders are worked with in a similar manner. Besides generic borders, each image on the disk has a corresponding border. The Amiga logo, for instance, uses a double check mark in a kind of rosette fashion, if you choose to use it as a border.

With Text, you click on Fonts and see familiar Notepad styles listed for you. As you select a font, it is visually represented at the lower left of the screen. Any font can be used as blended, boxed or outlined, multiplying your choices by three, and can also be made larger than normal.

Once you've chosen a font and returned to the slate, your typed-in words will appear in a message window below the slate. Using Place, put them where you choose. As with Images, lines of text can be moved into any position on the slate, giving you more spacing freedom than other similar programs allow. In addition, text can be flipped, copied, removed and so forth. Everything that can be done to an image can be done to text.

Text, however, is handled as a line. If you wish to manipulate a single word, it must be typed as a single word and entered into the correct space.

Image, Border and Text colors can be changed independently. Decide which of the three you chose to change, click on Color, click on a color from the palette at the bottom of the screen, then click on your choice (Image, Border or Text) and watch the color change. If the color displayed is still not quite right, clicking on Palette gives you a control panel that allows you to alter any color and use any of the 4,096 colors that the Amiga is capable of producing.

If all this weren't enough, *Deluxe Print* also allows you to print pictures created with *Deluxe Paint* or any painting or drawing program that stores images in IFF format. These pictures cannot be manipulated or edited in *Deluxe Print* (except for changing colors), but they can be used as stunning backgrounds or overlays with images, borders or text.

Electronic Arts includes a data disk in the *Deluxe Print* package, in addition to the program disk. The data disk gives you additional images that can be imported and added to your slate. It also includes 25 pictures made with *Deluxe Paint,* including an all-purpose birthday card and a beautiful view of Saturn as seen from one of its moons.

The documentation for *Deluxe Print* is the best we've ever seen. It is possible, however, to get excellent results with the program—on a purely instinctive level—without ever reading the manual. An appendix to the manual serves as a good primer on AmigaDOS and is a helpful reference when importing paintings from the data disk or from your own *Deluxe Paint* files.

Even if it did not allow printing in color, *Deluxe Print* would still represent state-of-the-art printing programs because of its pasteup working mode, its Place and Move options that allow more latitude in design, its font options and the stunning backgrounds that can be imported from other full-featured painting programs.

The lack of a color printer should not deter you from buying *Deluxe Print;* the program works well in black and white. Who knows? It might be exactly what you need to justify buying a color printer.

—Ervin Bobo

$99.95 retail
Electronic Arts; 1820 Gateway Dr.; San Mateo, Calif. 94404; 415-571-7171

KidTalk; Speller Bee

Reading, writing, spelling instruction

512K Amiga.

If you've ever wondered where educational software was bound or if it would become truly educational, take a look at *Kidtalk* and *Speller Bee* from First Byte Software. These two programs should please even those who may be dubious about the use of computers as teaching tools.

Kidtalk is a word processor with a few tricks and twists not found in adult versions of such programs. As the disk is booted—following Kickstart—a title screen appears, which is pronounced by a "soft" male voice.

Next, the computer asks if the user has ever used the program before. The response is made by clicking on one of two boxes, yes or no. If the answer is no, the user is asked to type in his or her name for future reference and for Secret Code files. Each prompt is written to the screen as well as spoken, further reinforcing the relationship between the written and spoken word.

A technique that makes the program easier for children to use is the mouse, used for selecting options from menus. Only the left mouse button is used.

The theory behind *Kidtalk* is that children will learn to read from their own writing. This is accomplished by providing users a screen upon which they can compose their own stories and have the computer read them back.

From the Talk menu, users may choose to hear the audio as each letter, word or sentence is typed in. They may also choose to hear only the completed version. Listening to each word alerts them to misspellings; listening to each sentence alerts to syntax errors; and listening to the final version should give a sense of whether a complete story is being told.

From the Control Panel, a user has the ability to change the voice of the computer.

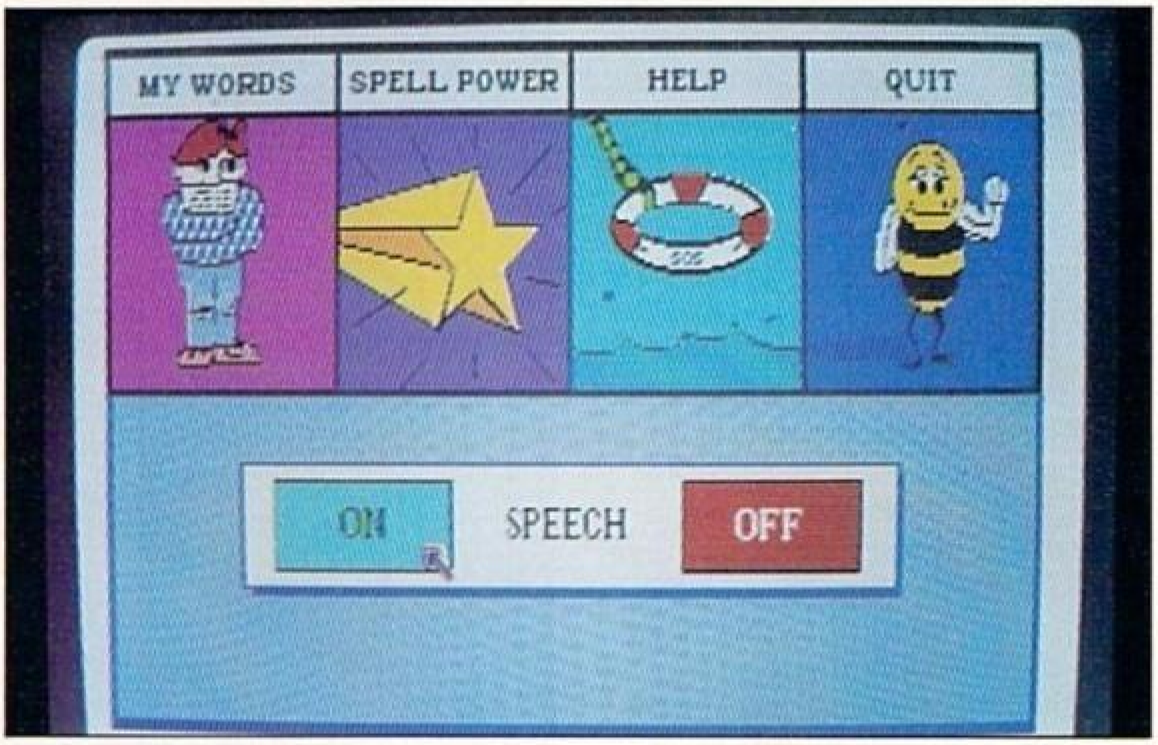
Dictionary Tricks is a two-part section. In Secret Codes, a user types in a real word and follows it with a code word. There apparently is no limit to how long the list can be. Once the words have been added to the user's file, complementary lists appear side by side at the top of the screen.

For example, using code words allows the user to type "love" and have it pronounced "hate." In this way, a child could write a note to his parents stating that he loves spinach. While his elders are beaming with joy, the child allows the computer to read the real note to them.

In the second section of Tricks, users can add the approximately five percent of English-based words that *Kidtalk* does not already know by first typing in the words and then retyping in their sounds-like forms. This seems to be an introduction to the use of phonemes.

Although it would have been easy to write a less functional program, dress it up with speech and sell it in a market hungry for new software, this is not the case with *Kidtalk*. There is real value here. My only quibble is with the age group specified for use, preschool to junior high. We feel that the upper limit for true interest in the game would be no more than age 12.

The program's documentation is good, geared to a seven or eight-year-old and well illustrated.



***Kidtalk* from First Byte**

Also highly recommended and also from First Byte is *Speller Bee,* where speech is used to teach and reinforce spelling skills.

As in *Kidtalk,* the emphasis is on the relationship between printed and spoken words. To practice spelling routines, users may work from their own list of problem words or use the program's built-in list of 150 frequently misspelled words.

From *Speller Bee*'s pull-down menus, users may choose My Words, which allows them to create their own lists using Listmaker. Up to 32 lists can be made, each containing as many as 10 words with a maximum of 15 letters each. These lists can be modified, erased or rewritten, as users progress toward more difficult levels.

The menu named Spell Power is the actual heart of the program. Each option chosen here begins by asking users to select their own word lists or those built into the program. As in *Kidtalk,* the options to be had are spoken as well as written on screen. For children who may not need the audible prompting, the sound may be turned off.

In Bee Prepared, users see words from any list, one at a time. They hear them spelled and pronounced and are given a chance to spell them themselves. With the sound on, a correct spelling is rewarded by hearing the computer pronounce the word. An incorrect answer is signaled by a message to that effect and a consequent lack of scoring.

In a game called Detective, users are presented with a word missing several letters. Below a box, the alphabet is displayed with each letter residing in a yellow circle. Users choose the letters they think belong in the word, not necessarily in order.

Scramble is exactly what it sounds like, a word game probably as old as written language—unscrambling words. Scoring is based on the number of words unscrambled correctly.

Search is also a familiar game, found in crossword puzzle books and daily newspapers. Within a block of seemingly random alphabetic characters, words from a word list are hidden, which users must locate. Scoring is based on elapsed time.

When users earn their best scores on any of the games, the rewriting of the scoreboard makes them feel very special, taking place among flashing colors and shapes and followed by a message that says they have achieved their very best score.

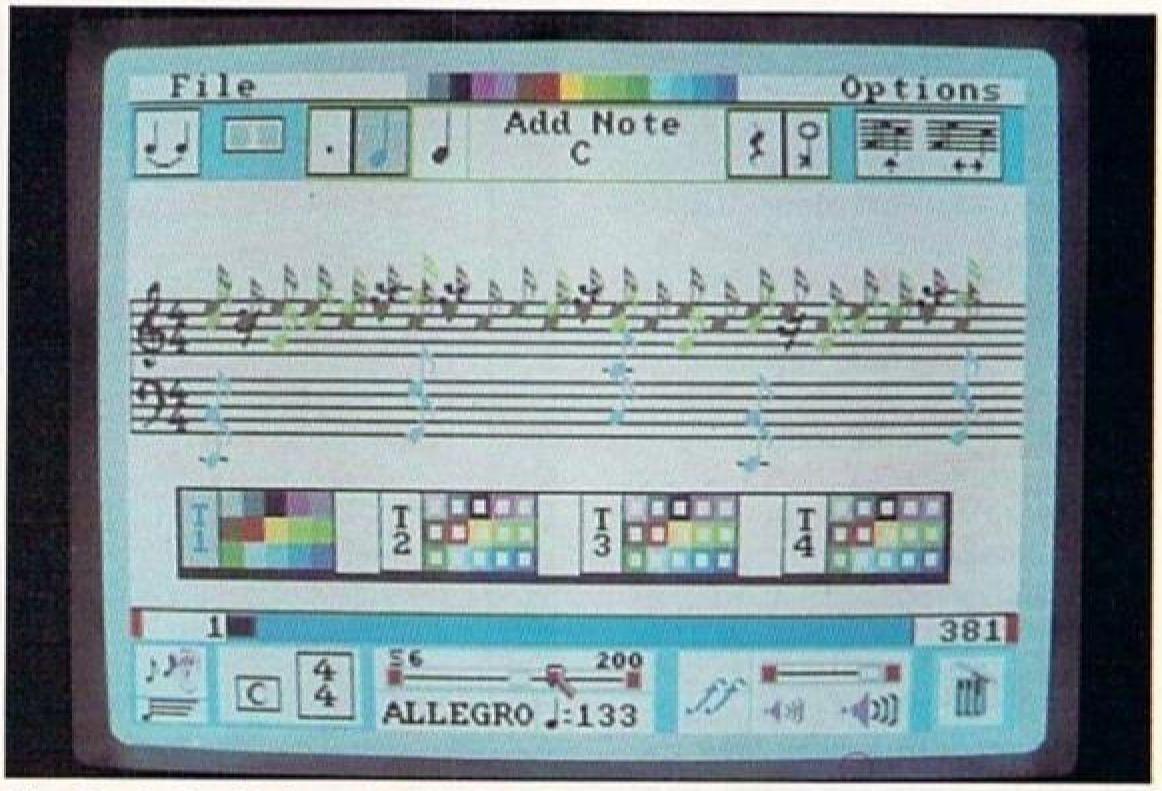
This is probably enough motivation to make any child want to do better in successive attempts. Since spelling depends greatly on repetition, the games accomplish their aims in a way that is not only painless but truly enjoyable.

Speller Bee's documentation is sparse, the games being simple enough that no lengthy explanations are necessary. We particularly like the second section of the book, which takes the time to explain to parents and educators the purpose and the objectives of the program.

Because of the routines for synthesized speech, both *Kidtalk* and *Speller Bee* require a 512K Amiga. That is a small price to pay. It's speech that causes these programs to succeed where other computer programs fall short. We recommend both programs.

—Ervin Bobo

$59.95 each retail
First Byte, Inc.; 2845 Temple Ave.; Long Beach, Calif. 90806; 213-595-7006



***The Music Studio* from Activision**

The Music Studio

Music composition

256K Amiga.

Since the advent of the *Pinball Construction Set*, the software market has been inundated with construction sets of all types. Some of these sets have been worthwhile; others are so frivolous as to have no point or purpose.

The Music Studio is a rather interesting new breed of construction-set software. It overlaps this broad range of programs, becoming as complex as a Mozart symphony or as unusual as a Cindi Lauper concert.

Studio gives you the tools needed to create sound and stretch the Amiga to its considerable limits. If that isn't enough, you can design your own tools or compose music with a MIDI instrument.

Making full use of the mouse for placement of notes and rests and for pull-down and pop-up menus, *Studio* boots immediately after Kickstart and, after a short wait, presents you with a title screen and a theme song.

Because many levels of composition are supported, you may begin at a level consistent with your own abilities. If you're a beginner, you might want to start by selecting a song from *Studio*'s library. You'll find something for any taste, be it classical, country, calypso or whatever.

After making your selection, you'll see the following message: "Sound Data Recalculation in Progress." This means your Amiga is preparing itself to play back the instrument sounds for which the song you chose was composed. It is your first hint that you have in your possession something truly awesome.

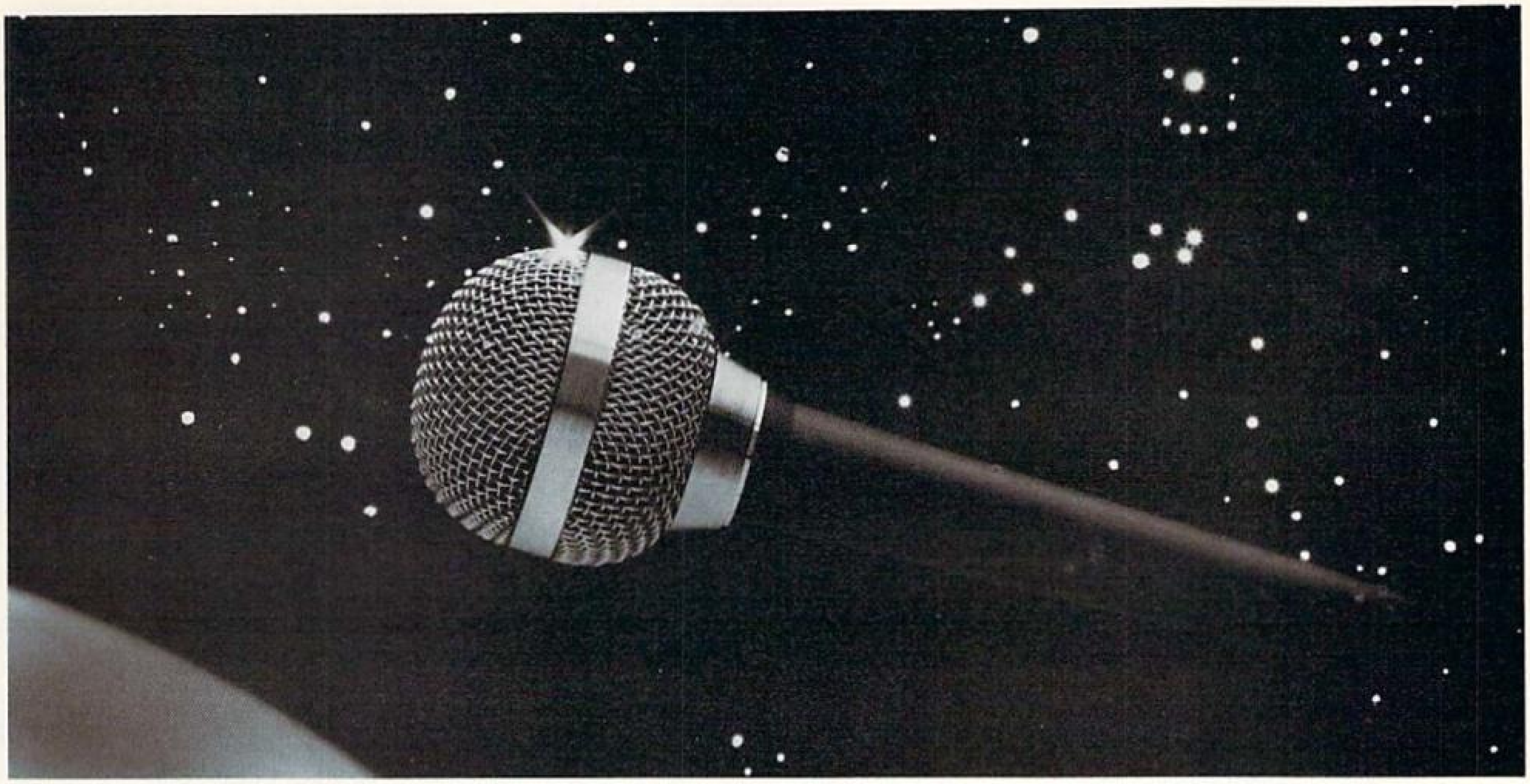
Mess around with the song if you want. You can't hurt anything. A slider bar at the bottom of the screen can be used to change tempo; clicking on the 4/4 box changes the measure; clicking on the box next to the 4/4 box changes key; and a slider bar at the bottom right can be used to change volume.

If you wish, go to the top of the screen and start adding notes. Play them back by clicking on the ear symbol. Make your own decision as to whether you improved the song or trashed it completely.

You'll notice that notes you add are displayed in color. Each of the 15 instruments built into *Studio* has its own color, allowing you to keep things sorted when composing.

These same colors guide you when in the program's Musical Paintbox section, where you deal with colored rectangles instead of notes. The size of a rectangle determines the duration of a note, and the color represents the instrument. Select a color from the palette of 15, select a rectangle, then move your cursor up to the grand staff and place the note where you think it should be located.

If this seems like a frivolous way to create music, let me add that *Studio* encourages such experimentation. You can't hurt the program, the computer or any-



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At last you can take full advantage of the sound capabilities of your Amiga. Applied Visions announces **FutureSound**, a digital sound recorder for the Amiga personal computer. With **FutureSound**, anyone can create the spectacular sound effects that makes your Amiga stand out from other microcomputers. **FutureSound** allows you to record *any* sound, *any* musical instrument, *any* voice, and use these recordings to add instruments to music packages, create realistic sound effects for your programs or add true voices to your applications. Multitrack recording and editing is provided as well as stereo playback. Sounds can be easily accessed from ''C'' or BASIC. **FutureSound** comes complete with recorder, cables, microphone and software—all for only $175. Available from your Amiga dealer or directly from us. Order now and find out just how creative you and your Amiga can be!

APPLIED VISIONS

Applied Visions, 15 Oak Ridge Road, Medford, MA 02155 (617) 488-3602 thing by trying something new. If a note is wrong, it can be changed again and again until it is exactly what you want.

The corresponding sound of a selected note is played as you move the note over the grand staff. This is an aid to let you know, before placement, the sound of the note you picked. If it matches the one you want, great. If not, try another.

When all the notes you picked sound the way you want, go to the Main Composing Screen. All your colored blocks will change to real notes that can be printed out as real sheet music. If you like, you can add lyrics before printing or saving.

The Main Composing Screen, what you saw when you loaded a song from the library, provides the following fine-tuning options: pull-down and pop-up menus that give you instrument selections; notes as short as 1/32nd duration; and ties, slurs and rests. This screen is used for serious composing.

Studio's Design Instrument Screen allows you to change the parameters of any instrument by changing its sound envelope. The sound envelope is represented by a graph that depicts the tone of a particular instrument. On the Design Instrument Screen, up to seven harmonics can be represented in their ADSR (attack, decay, sustain, release) cycles. By pointing and clicking on such options as Vibrato, Tremolo, Sustain Control and Amplitude Value, any instrument from the palette of 15 can be altered to your liking. As each change is made, the graph changes to represent the new ADSR.

This feature is of more interest to the advanced user, but the fact that *Studio* allows such advanced use and is still of value to the beginner speaks well for its designers. You may never need consider another music composition program.

The Music Studio also features full MIDI support. With a MIDI adapter plugged into your Amiga and connected to a MIDI instrument, such as a Casio keyboard, you can play your compositions through the instrument. In a turnabout that seems more magic than computer science, play the instrument and watch the notes appear on your monitor, ready for printing or saving.

It should also be noted that *Studio* allows stereo composition and working with multiple tracks. With the sound capabilities of the computer, you work within a range of five octaves and four voices and, like a good word processor, *Studio* allows you to copy, move or insert blocks of music.

The program's documentation is good. It takes you through the steps of using the program and stops now and then to explain unfamiliar terms and concepts.

The Music Studio is all you could ask for in a music composition program. While not a substitute for musical talent, it is a tool that enhances a user's existing talent by removing some of the drudgery connected with exercising that talent.

—Ervin Bobo

$59.95 retail
Activision, Inc.; PO Box 7286;
Mountain View, Calif. 94039;
415-960-0410

Online!

Telecommunications

256K Amiga.

With the introduction of *Online!*, a program for serious telecommunications, Micro-Systems Software takes another chunk out of the artsy pedestal erected for the Amiga and proves that the computer is also a down-to-earth productivity machine.

Residing on Workbench 1.1., *Online!* boots immediately after Kickstart and can easily be copied to another floppy or installed on a hard disk. The working copy will not only be for the usual data-storage purposes, because you will also be writing a lot of information to disk. Keeping the original clean means that, if a subsequent copy need be made, you won't have to do a lot of editing and deleting of old files.

Even for the first-time user, *Online!* is easy to use. Default support is for Hayes and Hayes-compatible modems, which covers most modems in use today. It's, therefore, possible to select Call from the Service pull-down menu, refer to your Hayes quick-reference card to dial a number and be on line in minutes.

This is how I first used the program, believing that the best software allows at least minimal use without need for study. Next day, I began reading the program's manual.

Online!'s documentation is clear, concise and easy to understand. It gives you an overview of telecommunications and the specifics of the program. The learning process is often made painless by a sprinkling of well-placed humor throughout the manual.

Online! supports baud rates from 300 to 19,200. The default setting is 1,200. That rate can be quickly changed by going to a pull-down menu and clicking the Amiga's mouse on a more appropriate rate. *Online!* also supports any word length or parity, with default settings of seven-bit word length, one stop bit and even parity.

Settings for the number you are about to call may be stored in a terminal file. This allows you to get on line more quickly next time by going to Archive Get and clicking on the file name. *Online!* will set the proper parameters and dial the number for you.

An extended form of automated calling can be obtained with a script file. *Online!* supports the creation of a script file for each

The Flow™ Idea Processor Helps You Survive the Information Age

The age of the computer has produced a virtual wilderness of personal complications. So much information needs to be organized. So many things need to be done. And there's only so much time to do them in. To survive you need a tool that lets you organize things the way *you* want them organized. You need Flow, the Idea Processor for the Amiga™ computer.

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And because Flow takes full advantage of the mouse, using it is intuitive. With the touch of a finger you can arrange and rearrange, find, sort, expand and condense at will. Drag whole blocks of entries to where you want them. Click twice to zoom in on the subtopics. Sort your entries, and quickly find the information you need.

Flow is a tool for organizing your writing, a tool for arranging schedules and appointments, a tool for categorizing and storing any kind of information. Flow is the multi-purpose tool you need to survive in the information age.

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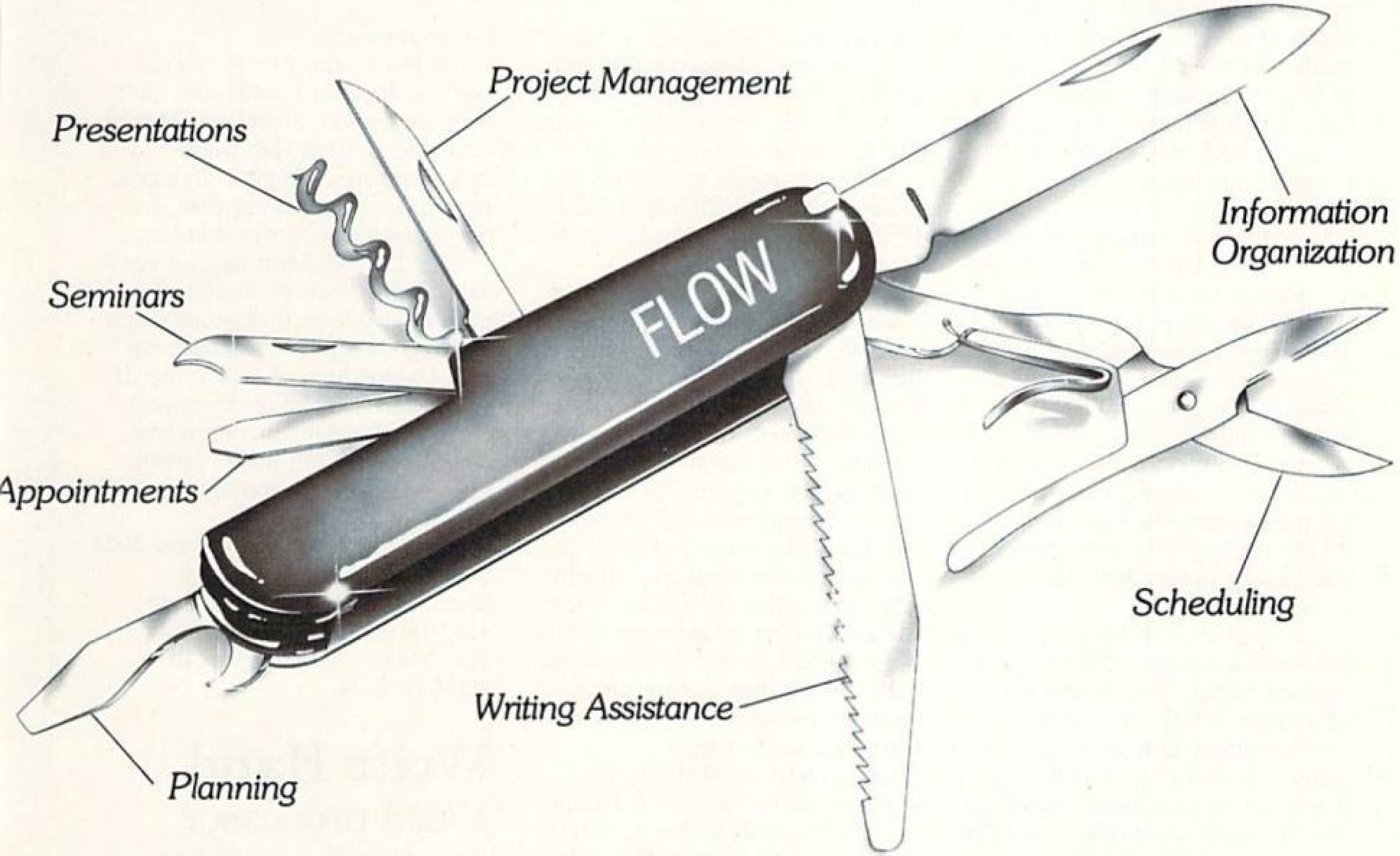

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New Horizons
SOFTWARE

New Horizons Software, PO Box 43167, Austin, TX 78745, (512) 280-0319

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number you call frequently. With a script file, similar to a program or a batch file, *Online!* will carry out all protocols, such as logging onto Compuserve and presenting your password and/or account number. The program will even go directly to your area of interest and download a specific file.

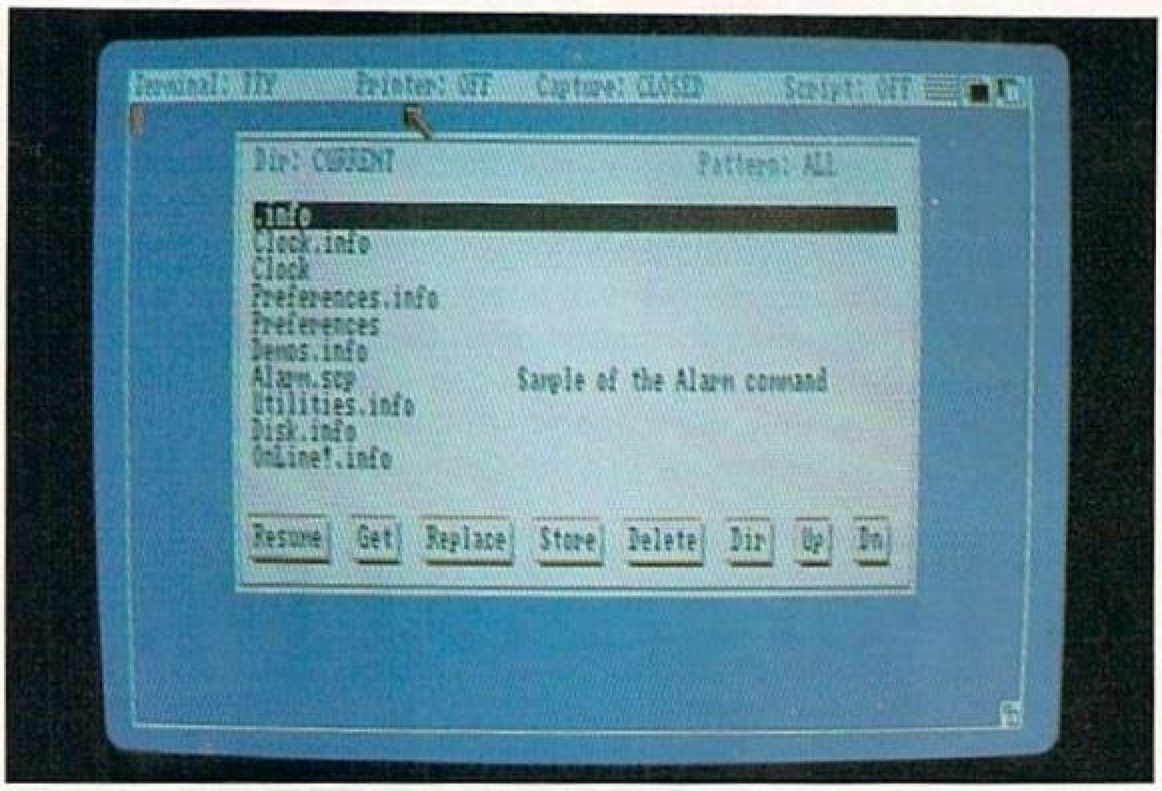
In creating a terminal file, you teach *Online!* how to make a call for you, much like telling a child which buttons to press on the phone. With a script file in place, however, your calls can be accomplished without you ever having to touch the keyboard, thereby reducing your involvement almost to zero.

The creation of such files is made easy by *Online!*'s learn mode. Simply call the bulletin board or service and log in normally. When you reach a prompt to which you must respond, press the ALT and L keys, type in your response and, where you would normally hit Return, type "|" (shift-virgule).

When you are where you wish to be on the bulletin board or the service, go back to the Service Archive on the pull-down menu and save it as a script file.

If you have already created a terminal file, you may link it to a script file for more complete automation. Next time you call, select the terminal file. It will set parameters, dial, go through all the checkpoints and deposit you exactly where you wish to be.

For downloading files, you may set aside a portion of RAM as a capture buffer. The suggested maximum is 64K. You may also capture direct to disk, screen or printer. It should be noted that downloading parameters can also be part of an automatic script file. If you frequently call Dow Jones to see how your stocks are doing, the parameters for downloading to printer or disk could be part of the script file that logs you on and gives your password.



```
Terminal: TTY     Printer: OFF    Capture: CLOSED      Script: OFF

Dir: CURRENT                                 Pattern: ALL

.info
Clock.info
Clock
Preferences.info
Preferences
Demos.info
Alarm.scp                  Sample of the Alarm command
Utilities.info
Disk.info
OnLine!.info
```

***Online!* from Micro-Systems Software, Inc.**

Uploading files is just as easy. You can send files from the text buffer or use one of the protocol methods that sends files in blocks and detects errors during transmission. Protocols supported by *Online!* include XMODEM, XMODEM/CRC and the Hayes Verification Protocol.

In addition to these standards, *Online!* also supports the Compuserve "B" protocol. When using this with the Compuserve service, *Online!* automatically responds to commands sent from Compuserve.

Once you've selected the protocol, select Transmit from the menu. A requester will prompt you for a file name and path. A pop-up window appears, showing you the number of blocks in the file and giving an estimate of the time needed for transmission. As with every other feature of *Online!*, we found file transfer extremely easy to use.

Other program features include: window sizes 79 columns by 22 lines with frame, or 80 columns by 23 lines without the frame; definable macro key sequences, where one keystroke can be used to enter a commonly used word or phrase; and user-definable redials for busy telephone numbers.

For those who like to "hang out" on bulletin boards and chat with the Sysop, a chat window is available. Within this window, you can carry on a CB-type dialogue, regardless of incoming data displayed on the primary window.

With its pull-down menus, easy-to-read documentation and requester windows that prompt you through its various routines, we find *Online!* to be a real value. If you've been avoiding telecommunications for fear of complexity, don't. *Online!* will make anyone you contact think you're an expert.

—Ervin Bobo

$69.95 retail
Micro-Systems Software, Inc.;
4301-18 Oak Cir.; Boca Raton,
Fla. 33431; 305-391-5077 or
800-327-8724

Write Hand

Word processor

Write Hand is a simple and useful word processor that allows the user to create and print material easily, while still providing the basic, essential editing commands. With complexities of the program being minimal, *Write Hand* gives even the novice computer user an easy way to process material.

The manual that accompanies *Write Hand* provides detailed instructions on how to write, edit and print letters and documents. Included in the manual is a tutorial exercise that gives a step-by-step account of entering *Write Hand*, starting word processing and using the edit and print modes. Following this tutorial exercise, the user is shown pictures of how the screen will appear at each stage of the editing and printing processes, which we found to be extremely helpful.

After using Kickstart, you insert the *Write Hand* disk. A double click on the *Write Hand* icon gives you a view of the Workbench. Another double click allows you to enter the program.

The master menu appears, and you have three choices to follow: the utilities function, word processing function or exit to the Workbench. The utilities function offers a menu that contains such features as file operations, backup/restore data files and manage system security. All of these are explained in detail in the manual. Choosing word processing presents you with a menu that includes: an edit file, a help menu, a print file and a file for document reformatting.

If you want to create a new file, enter the edit function. The screen shows a select-file and file-information window where data location, file name, disk space available, file type and margins are revealed. If beginning a new file, though, you do not name your file here. You do that after exiting the edit mode.

Next you see the screen as it will appear when you enter text, showing up to 20 lines at a time. A dotted line reading "end-of-text" stretches across the screen. The cursor is above it. At the bottom of the screen is the function key command menu for insert line, copy line, clear to end and adjust paragraph. Other commands are all explained in the manual.

These commands come in handy when doing tasks such as moving paragraphs, deleting lines, setting tabs and inserting new lines. Some of these functions, though, are used with the shift key, so it took some study, trial and error to understand them fully.

In order to move the cursor, you use the directional arrows. They are also used for scrolling text up and down. We found that the screen scrolls up or down only one line at a time and then realigns the whole text for each line scrolled. This makes getting to a remote paragraph or section rather slow. If you scroll—push the arrow keys—too often, you must wait for the computer to finish its scrolling process before you get the cursor back again. This, too, takes up valuable editing time.

In order to save what you are inputting, all you do is exit the edit mode by pushing ESCAPE. You are then presented with a menu of several entries, the last of which asks if you would like to go back to editing the file. If you do not, you return to the word processing menu.

We found the help file very useful. It provides a menu that includes an introduction, description of features, editing help and printing help. Especially useful is an editing Help feature that provides an alphabetical listing of 26 editing functions. One is a keyboard reference chart that shows, on a simulated keyboard layout, the functions that require a shift key, control key or some other special command.

Write Hand also provides underline and double-strike styles of print, which are controlled with the special key commands.

When you wish to change margins on text, you must go to the reformat document file on the word processing menu. This allows a quick, efficient way to readjust both the left and right margins and center your text on paper. Other *Write Hand* features include automatic word wrap and the ability to move blocks of text and figures of any size around.

Write Hand allows the use of batch commands. These are related instructions that appear on screen in the edit mode. They do not appear when printing, although they affect the printing format. An example of one of *Write Hand*'s batch commands is the form letter command that creates a custom form-letter format.

In order to enter the print mode, you choose print file from the word processing menu. The screen then lists text features that can be changed, such as lines per page, number of copies and page range. Up to three heading and/or footing lines may also be inserted.

Write Hand has an automatic page-numbering command as well as one that prints the correct time and date. Once these features have been set, a single RETURN keystroke begins the printing. *Write Hand* provides three commands that can quit, temporarily halt and resume printing. These commands appear on screen while printing is taking place.

We viewed the process of printing as rather inefficient. It requires you to leave the edit mode to print. After printing, you must go back to the main menu and begin again by entering, creating or printing a file.

Although *Write Hand* moves a little slowly at times when editing, it is an efficient program for creating letters, reports and documents that do not need a program full of fancy, complex functions.

—Eric Tenbus

$50 retail
Byte By Byte; 3736 Bee Cave Rd., Ste. 3; Austin, Texas 78746;
512-328-2985

Accounting

B.E.S.T. Business Management System

Integrated business management
A 20MB hard disk will increase capacity approximately 20 times.

Functions include: accounts receivable, accounts payable, inventory management, order processing, purchase orders, invoices, statements, checks and others—including standard and user-generated management reports. Even though the system is not modulized, functions may be used independently.

$395 retail
Business Electronics Software & Technology, Inc.; PO Box 852; McMinnville, Oreg. 97128; 503-472-9512 or 800-368-2378

CCI Bottom Liner A

Personal, small-business accounting
External disk drive.

An expandable accounting system designed for personal, home and/or small-business use.

The heart of the system is a detailed Ledger file with automatically assigned transaction numbers that provide an audit trail. The method used to enter items into the Ledger is user selectable, and the Ledger file is linked to both Account and Project files.

Single- or double-entry bookkeeping can be used. Cash flow, bank balances and a trial balance can be obtained from the Ledger.

Clockwork Computers, Inc.; 4612 Holly Ridge Rd.; Rockville, Md. 20853; 301-924-5509

CCI Merchandiser A

Transaction accounting, inventory control, customer lists
External disk drive.

CCI Merchandiser A handles transactions, inventory records, financial reports and analyses, accounts receivable and more.

Point-of-sale transactions are prepared on the system, invoices produced and inventory updated. Short-period (usually daily) and long-period (up to one year) files keep track of sales by cash, check, credit card, store charges and CODs. Refunds by cash, check, store credit or credit card are also tracked.

Clockwork Computers, Inc.; 4612 Holly Ridge Rd.; Rockville, Md. 20853; 301-924-5509

CCI Merchandiser A-Plus

Integrated accounting
512K Amiga; external disk drive.

CCI Merchandiser A-Plus is an integration of the *CCI Merchandiser A* and the *CCI Bottom Liner A* accounting programs to produce a fully integrated quotation, job order, sales transaction, inventory control, inventory costs and a complete accounting program. It manages a business with all the reports necessary through to forecasting sales and the balance sheet.

Available September, 1986
Clockwork Computers, Inc.; 4612 Holly Ridge Rd.; Rockville, Md. 20853; 301-924-5509

Financial Plus

Small business accounting
512K Amiga.

An integrated accounting package that incorporates general ledger, accounts payables, accounts receivables, payroll and word processing.

$295 retail
Byte By Byte; 3736 Bee Cave Rd., Ste. 3; Austin, Texas 78746; 512-328-2985

MiAmiga Ledger

General ledger accounting system
512K Amiga.

A double entry general ledger accounting system designed to be used in both the home and in small businesses.

The program produces a full range of financial and supporting reports that include balance sheet, income statement, general ledger report, chart of accounts and journals. Customized reports may also be created.

$99.95 retail
SoftWood Company; PO Box 2280; Santa Barbara, Calif. 93120; 805-966-3252 or 805-966-5884

PHASAR

Accounting system; register
512K Amiga.

PHASAR (Professional/Home Accounting System And Register) is a personal and/or small business accounting system.

Functions include entry and editing of transactions; bank statement reconciliation; various screen/printer reports showing a user's complete financial picture; full spreadsheet-type tax calculation that can be customized to a user's needs; and more.

$89.95 retail
Marksman Technology, Inc.; Rt. 5, Box 221A; Santa Fe, N.M. 87501; 505-455-2681 (information) or 800-334-7792 (sales)

Rags To Riches IV

Accounting

Rags To Riches IV modules include General Ledger, Accounts Receivable and Accounts Payable. The modules have been restructured to take advantage of the Amiga features: workbench compatibility, mouse support, use of icons, windows, multi-tasking, three-fold increase in reports and RAM-based speed.

$199.95 retail; per module
$499.50 retail; all three modules
Chang Labs; 5300 Stevens Creek Blvd.; San Jose, Calif. 95129; 408-246-8020

Business Graphics

Impact

Graphics
512K Amiga; external drive.

Displays numeric data in graphic form. There are two parts to the program; the first allows a user to create slides of graphs, charts, text and symbols in a free format, and the second plays the slides back in a predetermined sequence and fashion.

Available October, 1986; $199.95 retail
Aegis Development; 2210 Wilshire Blvd., Ste. 277; Santa Monica, Calif. 90403; 213-306-0735

Communications

A-TALK

Communications

A set of integrated communications tools that work together to help a user collect, control and transmit data.

$49.95 retail; not copy-protected
Felsina Software; 3175 S. Hoover St., Ste. 275; Los Angeles, Calif. 90007; 213-747-8498

A-Term

Communications

A terminal program that allows incoming data to be spoken through the speaker; data to be printed as it is coming over the line; support of protocols; auto-dialing and more.

$49.95 retail
MegaSoft Limited; PO Box 1080; Battle Ground, Wash. 98604; 800-541-1541 or 206-687-5205

BBS-PC!

Bulletin board system

A versatile electronic bulletin board system that transforms an Amiga into an on-line information network.

$99.95 retail
Micro-Systems Software, Inc.; 4301-18 Oak Cir.; Boca Raton, Fla. 33431; 305-391-5077 or 800-327-8724

D.A.S. Communications

Telecommunications

Features include VT100 emulation; support of 110 to 2400 baud; built-in bulletin board system with message base; and upload and download options.

$30 retail
Developers of Advanced Software; 12455 Veterans Memorial Dr., Ste. 204; Houston, Texas 77014

Digital Link

File transfer; telecommunications

Enables a user to transfer programs, data and text from IBM PCs, PC-compatibles and the Macintosh to the Amiga, and back.

It is also a telecommunication package that offers full terminal emulation for VT52, VT100, Televideo 925 series, ADM-3A, ANSI and TTY terminals.

$69.95 retail; *Digital Link*
$19.95 each retail; cables
Digital Creations; 530 Bercut, Ste. F; Sacramento, Calif. 95814; 916-446-4825

Genie

Integrated software
10MB; networked environment.

An integrated information management/electronic communication application program for computer conferencing and

dBMAN NEW FOR AMIGA! FREE EVALUATION DISKS

A DBASE III COMPATIBLE DATABASE MANAGEMENT SYSTEM FOR THE COMMODORE AMIGA

VersaSoft's **dBMAN** is a powerful, efficient time saving tool for developing databases related application programs.

dBMAN lets you create everything from simple mailing lists that use one file to complex applications like order entry systems that use many files with multiple indexes.

EASY TO LEARN

As powerful as it is, **dBMAN** is easy to learn. The 300+ page manual has sections for both the beginning and the advanced user. An on-disk tutorial program covers all of the basic commands.

EASY TO USE

Help with any command is never more than a keystroke away. Enter commands from the keyboard or create a file of commands that are executed automatically.

dBASE II AND II COMPATIBLE

Anyone knowing **dBASE** can use **dBMAN** right away.

FREE EVALUATION DISKS

Full featured evaluation copies are available *free* at authorized dealers. Try *ALL* of **dBMAN's** commands and functions and see for yourself how powerful it is.

MONEY BACK GUARANTEE

When you purchase **dBMAN** we guarantee that you'll be satisfied. If you're not, you can return it within 30 days of purchase for a full refund.

PRICING

dBMAN is only $149.95. the **dBMAN** run-time version is also available for $149.95 and there are NO LICENSE FEES

LOOK AT THESE dBMAN FEATURES!

- Compatible with **dBASE II** and **III**
- Programmable - executes automatically from command files
- Fast sorting and indexing of data
- Create menus with a single command
- Access any field of any open file WITHOUT SELECTing
- Multi-child tree relations.
- Supports global/local memory variables.
- Validate ANY data within a READ command
- Powerful debugger to test command files
- Edit your command file WHILE you debug
- Supports **dBASE, SDF, DIF** & delimited file formats

AVAILABLE Now! — Call your local Amiga dealer for more information

dBMAN is distributed by:

Apex Resources — 800-343-7535 • Computer Software Service — 800-422-4912 • Pacific Exchanges — 800-235-4137
Oreman Sales — 504-468-2001 • Southern Technologies — 214-247-7373 • Triangle Electronics — 800-245-6711

VERSASOFT

723 Seawood Way
San Jose, CA 95129
(408) 268-6033

*dBMAN trademark of VersaSoft, dBASE trademark of Ashton-Tate

Communications Continued

electronic mail in a networked environment. It is written in Pascal and designed for multiple user interfaces, including non-English interfaces.
Available first quarter, 1987
Data Dynamics, Inc.; PO Box 2728; Portland, Oreg. 97208; 503-626-4635

MaxiComm
Communications; file transfer utility
A modem or cabling for remote access.
An ANSI terminal and file transfer utility program that allows a user to connect an Amiga to public database services, public bulletin boards and another local computer.
$49.95 retail
MaxiSoft; 2817 Sloat Rd.; Pebble Beach, Calif. 93953; 408-625-4104 or 800-942-6294

Middleman
Terminal emulator
Allows an Amiga to emulate the functions of the DEC VT100 terminal.
$59.95 retail
Benaiah Computer Products, Inc.; PO Box 11165; Huntsville, Ala. 35814; 205-859-9487

Online!
Micro-Systems Software, Inc., see review on page 90

StarNet
Bulletin board network system
Features include X-modem protocol support, password operation, multi-level security systems, upload and download capabilities, menu operation and more.
Available September, 1986; $99.95 retail
Eight Stars Software, Inc.; 2900 Boniface Pkwy., Ste. 277; Anchorage, Alaska 99504; 907-345-6109

T-Link
Communications
Provides users with a telecommunications link to access bulletin board systems and information services across the country. It provides almost all of the popular communication protocols, allowing maximum access to available free public domain programs.
$79.95 retail
Techni Soft; PO Box 7175; 5505 Walden Meadows Dr.; Murray, Utah 84123; 801-2268-4961

Creative

Aegis Draw
CAD drawing package
512K Amiga; external drive.
A CAD drawing package used to create structured drawings that can be sent to a plotter or printer. Commands can be issued via the mouse, the keyboard or a digitizer.
$199.95 retail
Aegis Development; 2210 Wilshire Blvd., Ste. 277; Santa Monica, Calif. 90403; 213-306-0735

Amiga Coloring Book
Clip art
Each *Amiga Coloring Book* is a two disk volume of line art containing 20 files that a user can cut and paste to create his own graphics.
Volume 1: The Sampler contains 20 files that include more than 200 images.
Volume 2: The World contains 20 files with maps showing all the areas of the world and beyond.
$34.95 each retail
The Dragon Group, Inc.; 148 Poca Fork Rd.; Elkview, W.V. 25071; 304-965-5517

Analytic Art
Graphics, pictures
Can be used to produce precise drawings of striking beauty and complexity. Users don't have to understand math, programming or art to develop interesting pictures.
$59.95 retail
Crystal Rose Software; 109 S. Los Robles; Pasadena, Calif. 91101; 818-795-6664

Animator
Animation package
512K Amiga; external disk drive.
A metamorphic animation package that uses a concept called "tweening," which allows movement and change within each segment of the animation.
$139.95 retail
Aegis Development; 2210 Wilshire Blvd., Ste. 277; Santa Monica, Calif. 90403; 213-306-0735

Art Director
Allows a user to create storyboards and layouts, layout and justify text, experiment with colors and typefaces, create and move artwork and more.
Available fourth quarter, 1986
Grey Associates; 250 Bruton Way; Atlanta, Ga. 30342; 404-851-9103

Bobshop; Soundshop
Animation; sound
Bobshop is a Blitter-Object and animation editor that exploits the Amiga's custom graphics circuitry.
Soundshop exploits the sound production circuitry of the Amiga. With the program, waveforms may be read from files on the disk, displayed on the screen graphically and played through the Amiga's digital to audio converter.
$49.95 retail; both programs
Revolution Software; PO Box 38; West Chester, Pa. 19381; 215-430-0412

DeluxePaint
Color graphics; drawing; design
512K Amiga.
A paint program loaded with special features such as zoom enlarging, split-screen magnification, color cycling, blend, smear, stretch, bend and rotate.
$99.95 retail
Electronic Arts; 1820 Gateway Dr.; San Mateo, Calif. 94404; 415-571-7171

DeluxeVideo
Video production
512K Amiga.
Deluxevideo can be used to produce video slideshows, point-of-sales videos, animated commercials, business presentation videos, interactive educational videos, animations and home versions of MTV.
$99.95 retail
Electronic Arts; 1820 Gateway Dr.; San Mateo, Calif. 94404; 415-571-7171

DNA Music
Sequence mapping
512K Amiga; two disk drives; two RCA audio cables.
Allows a user to "hear" DNA by mapping a DNA sequence directly into a musical sequence.
$19.95 retail
Sterling Software; 77 Mead St.; Bridgeport, Conn. 06610; 203-366-7775

FutureSound
Digital sound recorder
Futuresound makes it possible to record, play back and store any sound directly on the Amiga.
Features include multitrack recording, variable recording speeds and variable playback speeds.
$175 retail
Applied Visions; 15 Oak Ridge Rd.; Medford, Mass. 02155; 617-488-3602

Graphicraft
Graphics creation
An entry-level graphics design and paint program that features 32 colors and special effects such as color animation.
$49.95 retail
Commodore Business Machines; 1200 Wilson Dr.; West Chester, Pa. 19380; 215-431-9180

Images
Creative
512K Amiga.
Allows a user to create paintings with as many as 32 different colors. Colors can be mixed and changed on a palette to get the exact colors needed. Circles and rectangles as well as free hand shapes can be drawn. There are 20 different brushes and 16 patterns available, all of which can be modified for custom designing.
$79.95 retail
Aegis Development; 2210 Wilshire Blvd., Ste. 277; Santa Monica, Calif. 90403; 213-306-0735

Imagine This
Image processing; software development
512K Amiga (recommended); video digitizer.
Image processing software system that turns an Amiga computer into an image processing workstation.
Available second quarter, 1986
Zoxso; PO Box 283; Lowell, Mass. 01853; 617-655-9548

The Music Studio
Activision, Inc., see review on page 88

VIP Professional™

Finally – A Business Program that Brings Lotus 1-2-3® Functionality to Your *Amiga*™!

VIP Professional is a state-of-the-art, integrated spreadsheet program which brings together a spreadsheet, a database and graphing capabilities. Modeled after the powerful and best-selling Lotus 1-2-3® program which dominates the business world, Professional will help you do your:

- Home Budget
- Loan Schedules
- Planning for:
  - Retirement
  - Investments
  - Insurance
- Accounting
- Inventory
- Payroll
- Business Plan
- Check Ledger
- Bookkeeping
- Accounts Payable
- Accounts Recievable
- Order Database
- Sales Database
- Business Graphics
- Engineering Problems

Worksheet Magic

Nothing is left out of the workings of the worksheet. Ranges of cells can be named for convenience; column widths are variable; the screen can be split into two windows; titles can be frozen; contents of cells may be copied or moved; the worksheet may be altered as a whole or only partially; the list goes on and on. Perhaps most important, Professional can use and save Lotus 1-2-3 files for transfer between computers.

The worksheet includes over 45 special functions to simplify commonly used formulas, including powerful financial functions for the internal rate of return, present value, and future value. Of course Professional also has all mathematical, trigonometric, table, conditional and logical functions.

Database Power

The built-in database can handle up to 8192 records, with a possibility of up to 256 fields. The records can be searched, sorted and analyzed to find your best salesperson or your rarest stamp. Sorts can be done using multiple criteria, in ascending and descending order. And database functions can be used to do up to seven different kinds of statistical analyses of your database.

Graphs

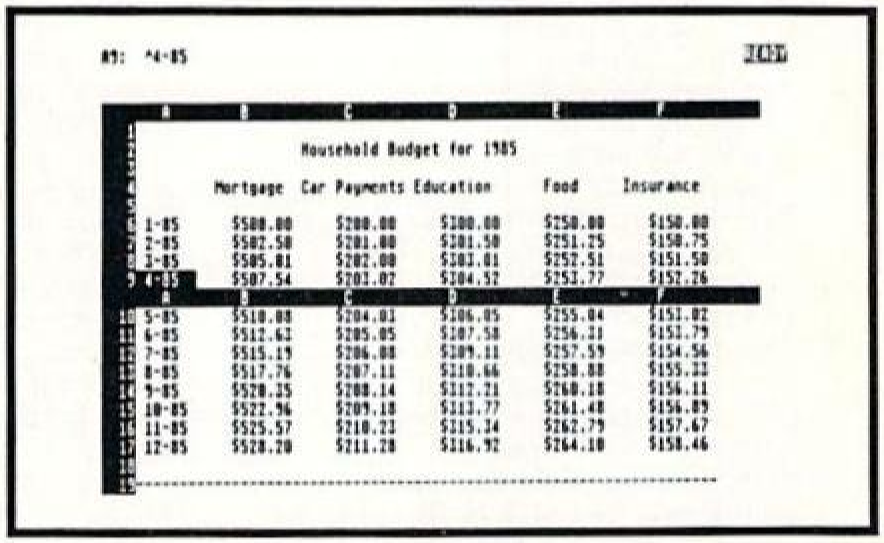
The graphing capabilities of Professional are astounding. Not only are there six completely different types of graphs available, there are tens of ways to manipulate the data, titles, grids, colors, legends, keys, and scaling of the size of the graph.

Macros

Professional also includes sophisticated macro programming commands. With several special macro commands, the user can actually *program* Professional to be dedicated to a specific task such as accounting.

Just Minutes to Learn

Professional is as easy to use as it is powerful. It comes with a user-sensitive tutorial for the newcomer. And help is built right into the program. With the handy tutorial, you will be able to create professional worksheets in just minutes.

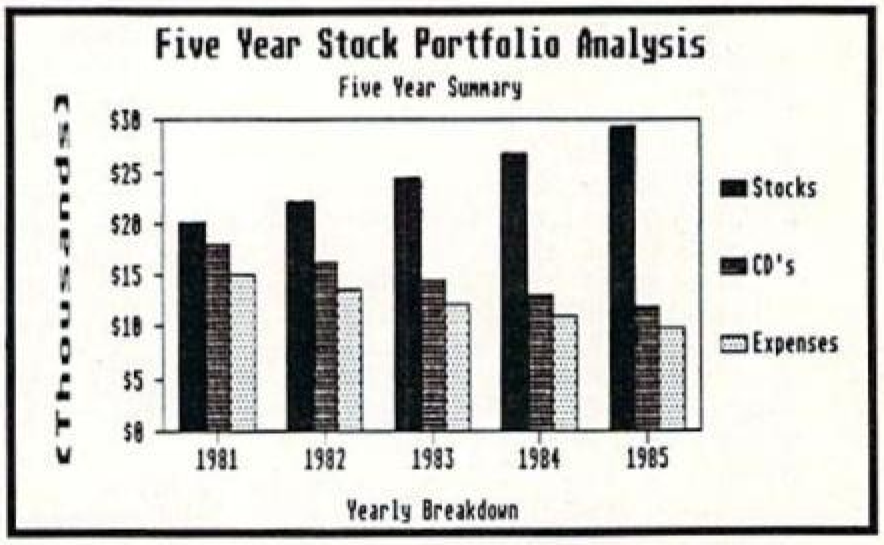


A9: ^4-85

Household Budget for 1985

	Mortgage	Car Payments	Education	Food	Insurance
1-85	$500.00	$200.00	$100.00	$250.00	$150.00
2-85	$502.50	$201.00	$101.50	$251.25	$150.75
3-85	$505.01	$202.00	$103.01	$252.51	$151.50
4-85	$507.54	$203.07	$104.52	$253.77	$152.26
5-85	$510.08	$204.01	$106.05	$255.04	$153.02
6-85	$512.63	$205.05	$107.58	$256.31	$153.79
7-85	$515.19	$206.08	$109.11	$257.59	$154.56
8-85	$517.76	$207.11	$110.66	$258.88	$155.33
9-85	$520.35	$208.14	$112.21	$260.18	$156.11
10-85	$522.96	$209.18	$113.77	$261.48	$156.89
11-85	$525.57	$210.23	$115.34	$262.79	$157.67
12-85	$528.20	$211.28	$116.92	$264.10	$158.46

Integrated Spreadsheet Power



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Send your check or money order to the address below, together with $3 for shipping and handling. California residents add 6% sales tax. COD's and purchase orders WILL NOT be accepted. Personal checks will be held for three weeks to clear. All prices are subject to change without notice.

vip TECHNOLOGIES

132 Aero Camino
Santa Barbara
California 93117

(805) 968-9567

SYSTEM REQUIREMENTS: Amiga with 512K; One disk drive; Monochrome or color monitor; Works with printers supported by the Workbench.

VIP Professional is a trademark of VIP Technologies Corporation; 1-2-3 and Lotus 1-2-3 are registered trademarks of Lotus Development Corp.; Amiga and Workbench are trademarks of Commodore-Amiga, Inc.

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Creative Continued

SoundScape
MIDI recording studio

Pro MIDI Studio is performance and recording software that provides complete facilities for routing, recording, editing, transposition and playback of any musical performance. $149 retail

MIDI Interface is necessary for programs that support MIDI to communicate with MIDI equipment. Contains MIDI In, Out and Thru connectors, and plugs into the serial port. $49 retail

Sound Digitizer allows any sound to be sampled and modified by the Amiga, including voice. $99 retail
Mimetics Corp.; PO Box 60238, Sta. A; Palo Alto, Calif. 94306; 408-741-0117

TV*TXT
512K Amiga; two disk drives.

A video production tool that enables a user to produce high resolution, animated video titles on the Amiga.
$249.95 retail
Zuma Group, Inc.; 6733 N. Black Canyon Hwy.; Phoenix, Ariz. 85015; 602-246-4238

Database

A Filer, A Report
Database

A Filer features include creation of disk files; sorting of information; printing out mailing labels; printing out a sorted or partially selected list; 12 fields per record and more. $49.95 retail

A Report features include creation of custom report headings; page numbering; column-type or multiple-line reports; calculation of totals and more. $49.95 retail
MegaSoft Limited; PO Box 1080; Battle Ground, Wash. 98604; 800-541-1541 or 206-687-5205

Amiga Record Manager
512K Amiga.

Features include 16 fields with user definable input and length; sorts on any field; arranges into zip code order or alphabetically; prints mailing labels; accounts ledger; and on-line help and tutorials.
Available September, 1986; $38 retail
HC Software Australia; GPO Box 2204; Adelaide, South Australia 5001; 08-428377

DATAMAT
Database manager
512K Amiga.

A menu-driven relational database management system for micro-to-mainframe applications that has an identical user interface across hardware and operating systems. It currently runs under AmigaDOS, MS-DOS, XENIX, UNIX and VMS.

Data-manipulation functions include statistical analysis, stepwise multiple regression and t-test on data or on transformation of same.

Features include a dynamic data dictionary, modular design, partial or total batch processing with interface to operating system batch utilities and process-dedicated or global computations with up to 26 selection criteria and conditional (if-then) logic.
$495 retail; A300 (AmigaDOS) or MX300 (MS-DOS)
$350 retail; A200 (AmigaDOS) or MX200 (MS-DOS)
$125 retail; A100 (AmigaDOS only)
Transtime Technologies Corp.; 797 Sheridan Dr.; Tonawanda, N.Y. 14150; 716-874-2010

The Data System
512K Amiga; two disk drives; Amiga-DOS 1.1 or later; ABasiC.

A full featured database management package that builds files, reports and lists with posting, totals, subtotals, calculations, etc., all on up to nine conditions.
$200 retail; without ABasiC
$210 retail; with ABasiC
Gander Software, Ltd.; 3223 Bross Rd., "The Ponds"; Hastings, Mich. 49058; 616-945-2821

dBMAN
Relational database manager
512K Amiga.

A *Dbase* compatible relational database manager that can be used for developing databases and database related application programs.

The program allows a user to create everything from simple mailing lists that use one file to complex applications like order entry systems that use many files with multiple indexes.
$149 retail
VersaSoft; 723 Seawood Way; San Jose, Calif. 95120; 408-268-6033

FoxFile
File management
256K Amiga; external disk drive optional.

A file manager that will accept up to 65,536 records.
$50 retail
Foxware; 1554 Park Creek Ln.; Atlanta, Ga. 30319

InfoBase
Database
512K Amiga.

A database program that provides many powerful functions. Each record can contain up to 200 fields of information.
$45 retail
Harvsoft; PO Box 725; Kenmore, N.Y. 14217; 716-877-3510

MiAmiga File
Database management
512K Amiga.

A database management system that may be used in a variety of applications in both the home and in business.

The program presents its databases in both list (spreadsheet-like) and form formats. The list format provides an overview of the database showing multiple records at a glance. The form format shows one database record at a time.

Miamiga File provides sorting and selection capabilities. Sorting may be performed on a single field or progressively on fields within other fields. Up to 32 levels of progressive sorting are supported.
$99.95 retail
SoftWood Company; PO Box 2280; Santa Barbara, Calif. 93120; 805-966-3252 or 805-966-5884

Integrated

VIP Professional
Integrated spreadsheet, database, graphics

Brings together a spreadsheet, a database and graphics capabilities in one program.

Modeled after *Lotus 1-2-3*, the program helps users do: home budgets; loan schedules; retirement, investment and insurance planning; accounting; inventory; payroll; business plans; check ledgers; and bookkeeping.

Built-in graph types include pie charts, stacked-bar charts, line graphs, bar graphs, scatter graphs and X/Y graphs. Titles, legends, grids and formats can be added, and users can also control scaling.
$199.95 retail
VIP Technologies; 132 Aero Camino; Santa Barbara, Calif. 93117; 805-968-9567

Miscellaneous Management

Computer Co-Pilot

Assists a user at his communication tasks, while learning about the user and his relation to the world.
Available fourth quarter, 1986; $900 retail
Alive Systems Group; PO Box 50; Big Sur, Calif. 93920; 415-332-8018

D.A.S. Business Finance

Assists business owners in making financial decisions and planning for future business expansion.
$30 retail
Developers of Advanced Software; 12455 Veterans Memorial Dr., Ste. 204; Houston, Texas 77014

Gizmoz Productivity Set
Desktop accessories

Contains 15 desktop accessories: calendar, rolodex, memo pad, black book, calculator set, hot key, free list display, cuckoo alarm clock, terminal package, announcer, graph package, popup cards, super life, data compressor and data encryptor.
$49.95 retail
Digital Creations; 530 Bercut, Ste. F; Sacramento, Calif. 95814; 916-446-4825

MaxiDesk
Business tools

Comprised of a set of useful business tools, including a calculator, appointment

calendar, alarm clock, phone book, keyboard helper and notepad.
$70 retail
MaxiSoft; 2817 Sloat Rd.; Pebble Beach, Calif. 93953; 408-625-4104 or 800-942-6294

Time & Task Planner
512K Amiga; two disk drives; Amiga-DOS 1.1; ABasiC.

A time management tool for up to five users that provides each user with a 60 item To Do List; a 60 item Future Planning List; an Appointment Scheduler; a Copy to Scheduler utility; and a Calendar utility.
$100 retail; without ABasiC
$110 retail; with ABasiC
Gander Software, Ltd.; 3223 Bross Rd., "The Ponds"; Hastings, Mich. 49058; 616-945-2821

Programming

3D Graphics Library
Available third quarter, 1986
Computer Food, Inc.; 2215 Sarah Ct., Ste. 80H; Norcross, Ga. 30093; 404-851-9103

A Copier
Nibbler
$39.95 retail
MegaSoft Limited; PO Box 1080; Battle Ground, Wash. 98604; 800-541-1541 or 206-687-5205

Advanced String Library
512K Amiga.
$49.95 retail
True BASIC, Inc.; 39 S. Main St.; Hanover, N.H. 03755; 603-643-3882

Amiga Intelligence
Artificial intelligence
512K Amiga.

Contains several artificial intelligence programs written in Amiga BASIC to provide a user with active exposure to AI-type programs and methods. Unprotected source code is included.
Available September, 1986; $49.95 retail
Westcomp; 517 N. Mountain Ave., Ste. 229; Upland, Calif. 91786; 714-982-1738

Amiga Lattice C Compiler
512K Amiga; two disk drives.
$149.95 retail
Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

Amiga Lattice dBC III Library
512K Amiga; two disk drives.
$150 retail
Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

Amiga Lattice Maclibrary
512K Amiga; two disk drives.
$100 retail
Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

Amiga Lattice Make Utility
512K Amiga; two disk drives.
$125 retail
Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

Amiga Lattice Screen Editor
512K Amiga; two disk drives.
$100 retail
Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

Amiga Lattice Text Utilities
512K Amiga; two disk drives.
$75 retail
Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

Amiga-Lint
Diagnostic facility for C
$98 retail
Gimpel Software; 3207 Hogarth Ln.; Collegeville, Pa. 19426; 215-584-4261

Amiga MS-DOS C Cross Compiler
512K Amiga; two disk drives.
$250 retail
Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

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A pressure-activated drawing pad, the EASYL™ lets you draw directly into the Amiga with a pencil.
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ACME™ or OXBERRY™ compatible registration pegs for producing frame-by-frame character animation are available. Please enquire.

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All drawings were created using EASYL™ with Deluxe Paint™ on the Amiga computer and output on an Ink-Jet printer.

Programming Continued

Amiga Panel Forms Manager
512K Amiga; two disk drives.
$195 retail
Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

Amiga Programmer's Library
Software development; file transfers
IBM PC for file transfers; C compiler; Amiga assembler and linker.
$200 retail
MaxiSoft; 2817 Sloat Rd.; Pebble Beach, Calif. 93953; 408-625-4104 or 800-942-6294

Aztec C68k/Am
C software development system
256K Amiga.

Aztec C68k/Am-d, the developer's system, includes a C compiler, 68000 macro assembler, a selective overlay linker, a versatile object code librarian, an editor and a full standard UNIX library.

Aztec C68k/Am-c, the commercial system, also includes the UNIX-style utilities Make, Grep and Diff; a "vi"-type editor; a symbolic debugger; library source; and an Amiga-to-Aztec object module converter.

$249 retail; *Aztec C68k/Am-d*
$499 retail; *Aztec C68k/Am-c*
Manx Software Systems; PO Box 55; Shrewsbury, N.J. 07701; 800-221-0440 or 201-542-2121

Commodore-Amiga
Programming languages
$199.95 retail; *Amiga LISP*
$149.95 retail; *Amiga C*
$99.95 retail; *Amiga Pascal*
$99.95 retail; *Amiga Macro Assembler*
Commodore Business Machines; 1200 Wilson Dr.; West Chester, Pa. 19380; 215-431-9180

Co-Pilot
Pilot language interpreter
512K Amiga.

A pilot language interpreter written in Amiga BASIC.

It includes the interpreter in compiled form, source form, full documentation on adding more commands and the internal operation of the interpreter.

Available September, 1986; $49.95 retail
Westcomp; 517 N. Mountain Ave., Ste. 229; Upland, Calif. 91786; 714-982-1738

Hex Utilities
Programming utilities
256K Amiga.

Hex Utilities perform conversions between binary files and Intel and Motorola hexadecimal file formats.

They can be used to download code to EPROM and logic programmers, transfer binary data between incompatible machines and debug microprocessor-based systems.

$49.95 U.S. retail
Capilano Computing Systems, Ltd.; PO Box 86971; N. Vancouver, B.C., Canada V7L 4P6; 604-669-6343

Hippo Eprom Burner
$199.95 retail
Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

HobKit I
Programming utilities

Hobkit I is a basic set of programs and utilities that includes *Funtime I* and *File Clerk I*.

Funtime I is a collection of animated color graphic routines, a music transcriber/composer and a music player driven by an extensive music meta language (MML).

File Clerk I includes all the utilities and routines needed to create commercial or data processing applications.

$125 retail; *Hobkit I,* includes *Funtime I* and *File Clerk I*
$50 retail; *Funtime I*
$100 retail; *File Clerk I*
Getting Enterprises, Inc.; 204 Hamilton Rd.; Bossier City, La. 71112; 318-747-4829

InfoMinder
Information resource

An information resource program that allows a user to access stored data.

The program consists of three parts: an access/display program, a text compiler and a programmer's interface.

$89.95 retail
Byte By Byte; 3736 Bee Cave Rd., Ste. 3; Austin, Texas 78746; 512-328-2985

Key To C
Developer's package

Key To C functions are similar to *BASIC,* including windows, screens, menus, graphics, requestors and alerts; and allow developers/programmers to use either source or object code.

Through the standardization of program modules, the software eliminates 30 to 40 percent of the procedures and time previously involved in program development of "C" applications.

$34.95 retail
Data Research Processing, Inc.; 5121 Audrey Dr.; Huntington Beach, Calif. 92649; 714-840-7186

Logic Compiler
Designers' aid
512K Amiga.

An aid for hardware designers who are using programmable logic devices, such as PLAs or PROMs, in digital circuits.

The compiler takes a high-level specification of internal device logic in text form and produces output data that can be used for device programming or simulation.

$129.95 U.S. retail
Capilano Computing Systems, Ltd.; PO Box 86971; N. Vancouver, B.C., Canada V7L 4P6; 604-669-6343

Metacomco
Programming
512K Amiga.
$199.95; *Cambridge LISP*
$99.95; *ISO Pascal*
Tenchstar, Inc. Metacomco; 5353 #E Scotts Valley Dr.; Scotts Valley, Calif. 95066; 408-438-7201

Metadigm Software
Programming tools
$95 retail; *Metascope: The Debugger*
$85 retail; *Metascribe: The Editor*
$69.95 retail; *Metatools I*
Metadigm, Inc.; 19762 MacArthur Blvd., Ste. 300; Irvine, Calif. 92715; 714-955-2555

The Micro Forge Programming
Programming utilities
$69.95 retail; *Programmer's Editor*
$89.95 retail; *Prolog Level 1*
The Micro Forge; 398 Grant St. SE; Atlanta, Ga. 30312; 404-688-9464

Micro-shell
Programming
256K Amiga.

Gives software developers the ability to repeat commands, rename commands, move within the file system and save and restore development sessions.

$79.95 retail
Meta-Soft, Inc.; PO Box 7293; Las Cruces, N.M. 88006; 505-523-0371

Multi-Forth
Software development
$179 introductory retail
Creative Solutions, Inc.; 4701 Randolph Rd., Ste. 12; Rockville, Md. 20852; 301-984-0262

Programmers Toolkit
512K Amiga.
Available fourth quarter, 1986; $124.95 retail
MicroDimensions, Inc.; 455 North University Ave., Ste. 206; Provo, Utah 84601; 801-377-0933

Program Generator
512K Amiga; two disk drives; Amiga-DOS 1.1 or later; ABasiC; The Data System.
$400 retail; without ABasiC
$410 retail; with ABasiC
Gander Software, Ltd.; 3223 Bross Rd., "The Ponds"; Hastings, Mich. 49058; 616-945-2821

Quick Test 1000
Digital waveform aquisition and storage
512K Amiga.
Available September, 1987; $800 to $1,200 retail
Syquest; PO Box 758; Snowdon Station; Montreal, Quebec, Canada H3X 3X9; 514-935-5881

Sorting & Searching
512K Amiga.
$49.95 retail

True BASIC, Inc.; 39 S. Main St.;
Hanover, N.H. 03755; 603-643-3882

Sprite/Graphics Editors
256K Amiga.

Allow a user to edit three-color, double sprites or six-color, quadruple sprites with 32 pixel/bits resolution.
$50 retail
Scott Lamb; 205C Heights Ln.; Ft. Worth, Texas 76112; 817-496-9220

T-Packs
Language utilities

T-APack is a package for 68000 assembly language programmers. It includes a program editor, a 68000 file disassembler and a UNIX-like "make" utility.

T-CPack , for 'C' programmers, contains a program editor, a UNIX-like "make" utility, a program cross-reference utility, a 'C' source code beautifier and "pretty print" utility and other utilities useful to 'C' programmers.

T-BPack is a package for Microsoft BASIC programmers. It contains a program editor, a BASIC source code beautifier and "pretty print" utility and a BASIC program cross-reference utility.
$49.95 each retail
Techni Soft; PO Box 7175; 5505 Walden Meadows Dr.; Murray, Utah 84123; 801-2268-4961

True BASIC Language System
512K Amiga.
$149.90 retail
True BASIC, Inc.; 39 S. Main St.;
Hanover, N.H. 03755; 603-643-3882

TxEd
Text editor
$39.95 retail
Microsmiths, Inc.; PO Box 561; Cambridge, Mass. 02140; 617-576-2878

WAO Robot
Computerized logic controlled robot
$149.95 retail
Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

ZLI
Line interpreter
$49.95 retail
Zoxso; PO Box 283; Lowell, Mass. 01853; 617-655-9548

Specific Application

3-D Graphics Library
Three-dimensional graphics
512K Amiga; True BASIC.

The *3-D Graphics Library* allows a user to create three-dimensional images.
$49.95 retail
True BASIC, Inc.; 39 S. Main St.;
Hanover, N.H. 03755; 603-643-3882

Chem101
CAI program
512K Amiga.

Performs various chemistry routines using graphics and voice capabilities.
Available September, 1986; $39.95 retail
Westcomp; 517 N. Mountain Ave., Ste. 229; Upland, Calif. 91786; 714-982-1738

Digital Building System

Graphically simulates digital electronics circuits on the Amiga's hi-res screen.

Standard schematic, logic and integrated circuit symbols are used to build the circuit on the screen using the mouse or keyboard to move parts around.
$299 retail
MicroMaster Software; 1289 Brodhead Rd.; Monaca, Pa. 15061; 412-775-3000

Dynamic-CAD
Computer aided design
512K Amiga; two disk drives; printer or plotter.

Designed for engineers and architects, it takes full advantage of Amiga's extensive capabilities with color, multiple modes of resolution, mouse functions and pull-down menus.

It is a two-dimensional drafting system with isometric capabilities that can be

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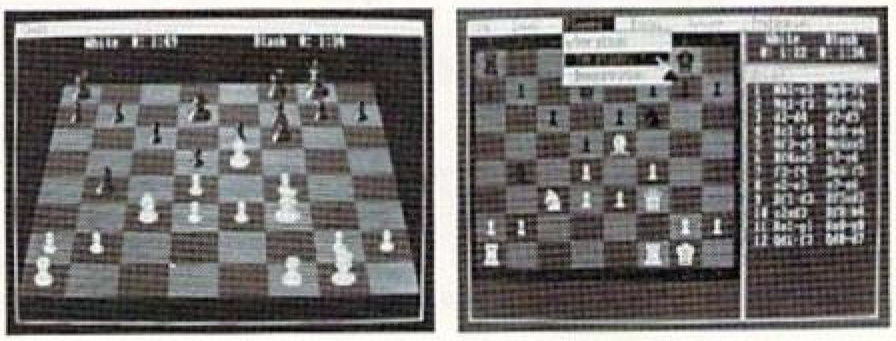

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$29.95 plus $2.50 shipping. NC residents add $1.35 tax. Requires 512K and Amiga Basic.

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Specific Application Continued

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ES5C Calculator
Programmable scientific calculator
A software module that emulates a programmable scientific calculator.
It resides in its own window and can run concurrently with other applications.
Emusoft Corp.; 1400 Chicago Ave., Ste. 303; Evanston, Ill. 60201; 312-869-6676

Film Production Toolkit
Scheduling and budgeting motion pictures
512K Amiga.
Designed to aid directors, production managers and assistant directors.
The program is written in the "C" programming language, and is designed to connect with a series of building blocks that will interface the program's scheduling and budgeting programs.
The system includes a Wizard feature that answers what-if questions about any planned or unplanned circumstances a producer may encounter.
$1,500 retail
Film Production Toolkit; 446 Sherman Canal Ct.; Venice, Calif. 90291; 213-306-2146

Grade Manager
Gradebook and statistics
Allows for the entry of any type of grade entry with full category weighting and renaming, automatic conversion of grades to a true 100-point scale and after-the-fact grade maintenance.
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Integrated logic design
A tool that contains schematic diagram entry and simulation capabilities, user-definable macro devices, PROM and PLA support and interactive operation.
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Quiz Master
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Allows a teacher to create and give tests or quizzes directly on the computer. Two additional support packages, *Music Student I* and *II*, take the student through all major areas of music theory such as symbol recognition, scales, chords, etc.
$79.95 retail; *Quiz Master*
$49.95 retail; *Music Student I* and *II*
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SciCalc
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256K Amiga.
A full featured scientific calculator. Features include algebraic hierarchy with automatic constant, 10 memories, powers, logs, trig, hyperbolics, statistics and polar/rectangular conversion.
$14.95 retail
D.L. DeFore; PO Box 47577; St. Petersburg, Fla. 33743

Station Manager
A full featured television station management system. The first module to be completed is the weather graphics system.
Additional modules will be available to handle inter-office mail, teleprompting, down-loading from news and weather services and production of news "copy." This will link together all newsroom services.
$1,995 retail; *Station Manager*
$995 retail; weather system
Associated Computer Services; 839 South Glenstone; Springfield, Mo. 65802; 417-865-6555

The Vise
Investment
512K Amiga.
A program that advises a user in property investment.
Available November, 1986; $150 retail
Westcomp; 517 N. Mountain Ave., Ste. 229; Upland, Calif. 91786; 714-982-1738

Write-To-Left
Cybernetic tool for exploring consciousness
256K Amiga.
Can be used to open a channel to a user's subconscious by investigating left-right brain hemisphere functions, or to give expression to deeper aspects of a user's personality.
$29.95 retail
X-Scope Enterprises; PO Box 210063; Columbia, S.C. 29221; 803-779-0619

Spreadsheets

Amiga Unicalc Spreadsheet
512K Amiga; two disk drives.
An electronic spreadsheet that provides a 256 column by 1,024 row processing area.
$79.95 retail
Lattice, Inc.; PO Box 3072; Glen Ellyn, Ill. 60138; 312-858-7950

Analyze!
Spreadsheet
512K Amiga.
A spreadsheet program that provides a 256 column by 8,156 row processing area.
$99.95 retail
Micro-Systems Software, Inc.; 4301-18 Oak Cir.; Boca Raton, Fla. 33431; 305-391-5077 or 800-327-8724

MaxiPlan
Spreadsheet
512K Amiga; external disk drive recommended.
A spreadsheet program that provides a 512 column by 16,384 row processing area and what-if analysis with numerical data.
MaxiSoft; 2817 Sloat Rd.; Pebble Beach, Calif. 93953; 408-625-4104 or 800-942-6294

Utilities

A Disk
Two-drive emulator
A two-drive emulator that allows a user to load and run programs without continually swapping the Workbench disk.
$29.95 retail
MegaSoft Limited; PO Box 1080; Battle Ground, Wash. 98604; 800-541-1541 or 206-687-5205

Clock For Amiga
Utility
A small cartridge that plugs onto the side of the Amiga. The time of day is set automatically each time the computer is turned on, and the clock will run for two years even when the Amiga is turned off.
$59.95 retail
Skyles Electric Works, Inc.; 231-E South Whisman Rd.; Mountain View, Calif. 94041; 800-227-9998 or 415-965-1735

D.A.S. Disk Editor
Utility
Any Amiga.
A utility program that allows a user to change any byte(s) on a disk and display

sectors in Hex, Octal, ASCII and Decimal format.
$20 retail
Developers of Advanced Software; 12455 Veterans Memorial Dr., Ste. 204; Houston, Texas 77014

Deluxe Print
Electronic Arts, see review on page 83

Disk Guru
A utility program that includes undeleting files, recovering bad files (when possible), viewing files in various formats, editing files and directories one byte at a time and more.
Available third quarter, 1986
Computer Food, Inc.; 2215 Sarah Ct., Ste. 80H; Norcross, Ga. 30093; 404-851-9103

Disk Library
Provides a way to organize the contents of a disk for easy access.
$49.95 retail
Classic Image, Inc.; 510 Rhode Island Ave.; Cherry Hill, N.J. 08002; 609-667-2526

Disk Traffic Controller
Master disk catalog system
Two disk drives recommended.
Grey Associates; 250 Bruton Way; Atlanta, Ga. 30342; 404-851-9103

Diskwik
Disk utility package
512K Amiga.
Gives a user total access and control of his disks.
Features include restoring deleted files; eliminating any errors on a disk (except those due to defective disks); editing in hex or ASCII; copying blocks to the same or another disk; reformatting tracks; correcting checksums; and much more.
$49.95 retail
Tigress; PO Box 665; Glendora, Calif. 91740; 818-334-0709

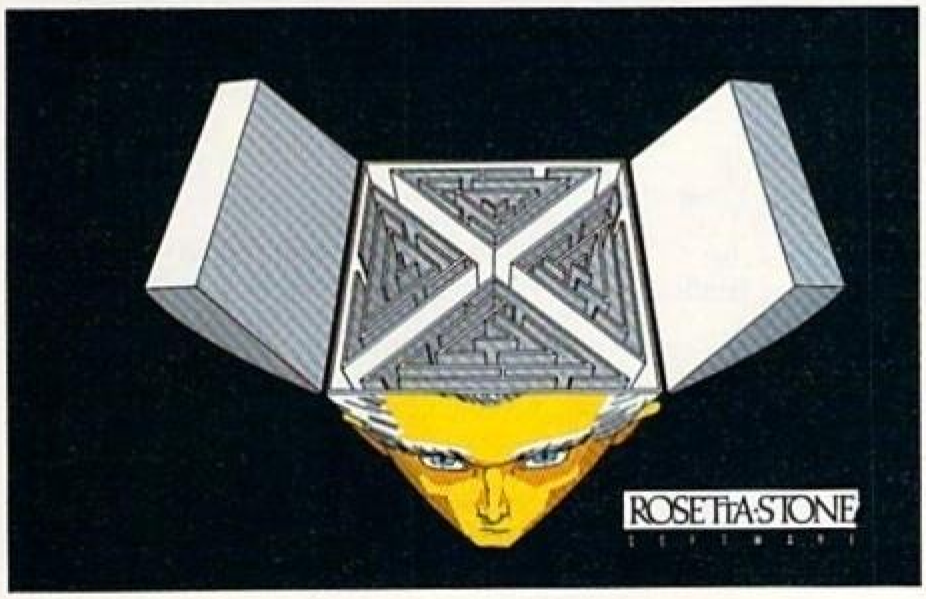
HippoPixel
A font and sprite editor that includes timed animation sequence.
$59.95 retail
Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

Laserwriter Utilities
AmigaDOS; Apple Laserwriter; serial cable; modem eliminator; external disk drive.
A collection of *Postscript* procedures for formatting text on the Laserwriter.
$30 retail
S. Anthony Studios; 889 De Haro St.; San Francisco, Calif. 94107; 415-826-6193

Marauder
Disk backup utility
A utility program designed to make accurate backup copies of both copy-protected and unprotected software.
$39.95 retail
Discovery Software; 262 S. 15th St., Ste. 300; Philadelphia, Pa. 19102; 215-546-1533

Maxipower Series
Utilities
Maximizer is a mouse/keyboard record and playback. It can be used with a word processor or an art tool such as *Dpaint*, *Graphicraft*, etc.
Maxicache is a floppy disk performance enhancement that allows a floppy to work faster than a hard disk.
Maxikey is an abbreviation handler for word processing and programming.
$29.95 each retail
MaxiSoft; 2817 Sloat Rd.; Pebble Beach, Calif. 93953; 408-625-4104 or 800-942-6294

The On-line AmigaBASIC Manual
On-line help utility
256K Amiga.
An online help utility program that includes pull-down menus for help on all the BASIC instructions, as well as how-to information and tips on BASIC programming.
Available November, 1986; $29.95 retail; not copy-protected
Omega Star Software; PO Box 1831; Clemson, S.C. 29633; 803-882-3602



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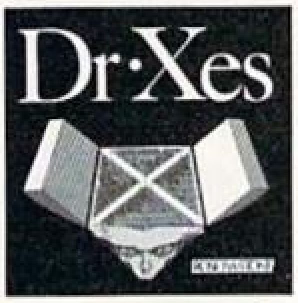

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Utilities Continued

The On-line AmigaDOS Manual Version 1.1
An on-line DOS and CLI help utility

Menus provided are DOS Help, which contains how-to sections on DOS devices, directories, command formats and other DOS features; Commands, which contains all of the AmigaDOS commands underlying the Workbench, broken down into menu categories; and more.
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Pick Your Preferences
Startup file
256K Amiga.

An auto-running startup file that presents a user with a menu that lists the available preference settings on a disk.

A user can create new preference settings or edit existing ones with the standard Amiga Preferences Editor.
$29.95 retail
MicroMaster Software; 1289 Brodhead Rd.; Monaca, Pa. 15061; 412-775-3000

RAM Disk
Memory partitioning utility

Gives high speed capabilities to users of the Workbench interface. The program appears as a normal disk icon and functions in all ways as a normal Amiga disk drive.
The Micro Forge; 398 Grant St. SE; Atlanta, Ga. 30312; 404-688-9464

T-Util
File recovery

Consists of four programs: *Recover-All, Recover-Deleted, Un-Kill* and *Diskedit.* These files are designed to run from the CLI environment, and instructions are provided in the manual for users who are not familiar with CLI.
$69.95 retail
Techni Soft; PO Box 7175; 5505 Walden Meadows Dr.; Murray, Utah 84123; 801-268-4961

Word Processing

E.T. Writer
256K Amiga; printer.

Turns an Amiga computer and printer into a full-featured electronic typewriter. It can be used to write short memos, fill in forms, address envelopes and more.
Available fourth quarter, 1986; $49.95 retail
T.R. Software; 4346 W. Maypole; Chicago, Ill. 60624; 312-875-9760

Flow
Idea processor
256K Amiga.

A tool that assists in creating sales reports, school papers and novels; helps plan business strategies and schedule appointments; and organizes thoughts and ideas.
$99.95 retail
New Horizons Software; PO Box 43167; Austin, Texas 78745; 512-280-0319

HippoConcept

An outliner and idea processor with multilevel conceptual structuring and unrestricted outline formatting.
$119.95 retail
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HippoSpell

A generic spell checker that contains a user defined or 30,000 word dictionary.
$59.95 retail
Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

HippoWord

A full-featured, multiple font word processor with mail-merge and macro capabilities.
$189.95 retail
Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

IdeaCraft
Idea processor
512K Amiga recommended.

A versatile idea processor that gives a user the capability to organize thoughts, see any level of detail of work, categorize ideas and order items in various ways.

The program allows a user to prioritize items; sort alphabetically or numerically, by dictionary order or character order, with or without accent marks; store names, address, phone numbers, appointments and miscellaneous notes; move headers up and down; and much more.
$89 retail
The Great American Softworks; PO Box 819; Larkspur, Calif. 94939

Laserwriter Fonts Vol. 1
AmigaDOS; Apple Laserwriter; serial cable; modem eliminator; external disk drive.

A collection of three downloadable analytic (not bit-mapped) fonts for the Laserwriter printer.
$30 retail
S. Anthony Studios; 889 De Haro St.; San Francisco, Calif. 94107; 415-826-6193

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words. It can search up to four user-supplied word lists of unlimited length which can, for example, hold names and technical words.
$60 retail
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Scribble!
Word processor
256K Amiga.

A full-featured word processor that contains basic word processing capabilities and advanced features.
$99.95 retail
Micro-Systems Software, Inc.; 4301-18 Oak Cir.; Boca Raton, Fla. 33431; 305-391-5077 or 800-327-8724

Talker
Word processor

An easy-to-use word processor that talks.
$49.95 retail
Rosetta-Stone Software; 4000 MacArthur Blvd., Ste. 3000; Newport Beach, Calif. 92663; 714-854-4434

Textcraft
Word processing

An entry-level word processor that stresses ease of use, on screen documentation and templates for business letters, memos, etc.
$99.95 retail
Commodore Business Machines; 1200 Wilson Dr.; West Chester, Pa. 19380; 215-431-9180

TV*FONTS
Video; presentation graphics
512K Amiga.

Designed for use in video and presentation graphics applications.

Each of the volumes contains font sizes ranging from 20 to 100 points for screen resolutions of 320 x 200, 640 x 200 and 640 x 400.
$29.95 per volume retail
Zuma Group, Inc.; 6733 N. Black Canyon Hwy.; Phoenix, Ariz. 85015; 602-246-4238

Wordwright
Word processing
512K Amiga.

A word processor that can handle large text files and is oriented to the user who wants total control over the way text is printed.
$75 retail
RTL Programming Aids; 10844 Deerwood SE; Lowell, Mich. 49331; 616-897-5672

Write Hand
Byte By Byte, see review on page 92

Personal And Home Software

Education

Algebra
512K Amiga.
$49.95 retail
True BASIC, Inc.; 39 S. Main St.; Hanover, N.H. 03755; 603-643-3882

Amiga Training Tapes
Basic and advanced video training
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$39.95 retail; tape disk and user guide
Organic Productions; 71 Gold St.; East Hartford, Conn. 06118; 203-569-3855

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$65 each retail
Intellectual Software, a division of Queue, Inc.; 562 Boston Ave.; Bridgeport, Conn. 06610; 800-232-2224

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"*Very highly recommended by me is* **Conversation With A Computer,** *from Jenday Software, a set of games and conversation written in Amiga Basic, and shipped with the source code provided. It is entertaining, amusing, thought provoking, and just plain fun. If you have any interest in programming in BASIC on the Amiga this is a* **must have** *for the examples.*"
—MATTHEW LEEDS
Commodore Microcomputers

Conversation With A Computer is a truly novel piece of software that really shows off Amiga's special abilities. You'll carry on an entertaining voice-synthesis conversation with your computer. There are wild graphics routines, colorful screen displays, sound effects and animated objects. Amiga will challenge you to three separate games that are guaranteed to pickle your brain. NOW INCLUDES AN INTRODUCTION TO THE C LANGUAGE!

SOURCE CODE
Conversation With A Computer is 2,000 lines of Microsoft's amazing Amiga Basic. You can list the Source code on your screen or printer. The documentation explains how it all works. It's a complete programming course for your Amiga.

NOT COPY-PROTECTED.

JENDAY
SOFTWARE

PO. Box 4313-B, Garden Grove, CA 92642
Phone: (714) 636-3378

CONVERSATION WITH A COMPUTER WITH SOURCE CODE: $29.50
Add $2.50 postage and handling. California residents add 6% sales tax. Immediate delivery. Requires 512K.

DEALER INQUIRIES INVITED

Education Continued

Chance
Probability theory
512K Amiga.

Examines topics and illustrates problems in probability theory. It can serve as a supplement to a course in probabilty theory or to a course containing a unit on probability.
$49.95 retail
True BASIC, Inc.; 39 S. Main St.;
Hanover, N.H. 03755; 603-643-3882

Comprehensive Grammar Review I And II
$54.95 each retail
Intellectual Software, a division of Queue, Inc.; 562 Boston Ave.; Bridgeport, Conn. 06610; 800-232-2224

Decimal Dungeon
Fraction Action
Math Wizard
Math programs
$49.95 each retail
Unicorn Software Co.; 2950 E. Flamingo Rd.; Las Vegas, Nev. 89121; 702-732-8862

Discovery
Interactive educational space adventure
512K Amiga; joystick.

Through the mastering of mathematical and spelling challenges a user explores and repairs the inner workings of the spaceship *Discovery.*

It is available in math or spelling versions, and grade levels can be set at 1 through 7 for math challenges, or 1 through 10 for spelling.
$39.95 retail
MicroIllusions; PO Box 3475; Granada Hills, Calif. 91344; 818-360-3715

Discrete Math
512K Amiga.
$49.95 retail
True BASIC, Inc.; 39 S. Main St.;
Hanover, N.H. 03755; 603-643-3882

French And Spanish Grammar
$34.95 each retail; *French Grammar I, Spanish Grammar I, II, III*
Intellectual Software, a division of Queue, Inc.; 562 Boston Ave.; Bridgeport, Conn. 06610; 800-232-2224

Geography
$59.95 each retail; *U.S. Geography Adventure, World Geography Adventure I, II, III, IV*
Intellectual Software, a division of Queue, Inc.; 562 Boston Ave.; Bridgeport, Conn. 06610; 800-232-2224

The Halley Project: A Mission in Our Solar System
Educational game
$44.95 retail
Mindscape, Inc.; 3444 Dundee Rd.;
Northbrook, Ill. 60062; 800-221-9884 or 800-942-7315 in Ill.

Hippo Computer Almanac
Reference software that contains more than 35,000 useful facts in 17 topic areas.
$34.95 retail
Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

History
$59.95 each retail; *American History Adventure, How A Bill Becomes A Law, World History Adventure*
Intellectual Software, a division of Queue, Inc.; 562 Boston Ave.; Bridgeport, Conn. 06610; 800-232-2224

Keyboard Cadet
Typing instruction
$39.95 retail
Mindscape, Inc.; 3444 Dundee Rd.;
Northbrook, Ill. 60062; 800-221-9884 or 800-942-7315 in Ill.

KidTalk
First Byte, Inc., see review on page 86

Lessons In Reading And Reasoning
$149.95 retail
Intellectual Software, a division of Queue, Inc.; 562 Boston Ave.; Bridgeport, Conn. 06610; 800-232-2224

MasterType
Typing tutor
$39.95 retail
Scarborough Systems, Inc.; 55 S. Broadway; Tarrytown, N.Y. 10591; 914-332-4545

Paraclete
Music aid
$89.95 retail
Associated Computer Services; 839 South Glenstone; Springfield, Mo. 65802; 417-865-6555

Practical Composition And Sentence Completion
$44.95 retail; *Practical Composition I: Making Words Work*
$54.95 retail; *Practical Composition II: Logical, Clear Sentences*
$44.95 retail; *Practical Composition III: Selecting The Best Approach*
$44.95 retail; *Practical Composition IV: Making Sentences Work*
$44.95 retail; *Practical Composition V: Using Words Correctly*
$149.95 retail; *Practical Composition Package I;* includes *Practical Composition I, II* and *III*
$85 retail; *Practical Composition Package II;* includes *Practical Composition IV* and *V*
Intellectual Software, a division of Queue, Inc.; 562 Boston Ave.; Bridgeport, Conn. 06610; 800-232-2224

Pre-Calculus
512K Amiga.
$49.95 retail
True BASIC, Inc.; 39 S. Main St.;
Hanover, N.H. 03755; 603-643-3882

Reading
$65 retail; *College Aptitude Reading Comprehension Exercises*
$39.95 retail; *Reading Adventure I*
$59.95 each retail; *Reading Adventure II, III*
$54.95 each retail; *Reading and Thinking I, II, III*
Intellectual Software, a division of Queue, Inc.; 562 Boston Ave.; Bridgeport, Conn. 06610; 800-232-2224

Speller Bee
First Byte, Inc., see review on page 86

Starting A New Business
A simulation game that teaches the ins and outs of starting a new business venture
$59.95 retail
Intellectual Software, a division of Queue, Inc.; 562 Boston Ave.; Bridgeport, Conn. 06610; 800-232-2224

Trigonometry
512K Amiga.
$49.95 retail
True BASIC, Inc.; 39 S. Main St.;
Hanover, N.H. 03755; 603-643-3882

Typing Tutor And Word Invaders
Typing instruction

Typing Tutor teaches touch typing by starting with the home keys and advancing to new keys in gradual steps as a user's skills develop.

Word Invaders is a typing game that adds fun to the typing sessions while reinforcing proper typing techniques. Invading words must be blasted out of the sky before a user's base is destroyed.
$34.95 retail
Academy Software, Inc.; PO Box 6277;
San Rafael, Calif. 94903; 415-499-0850

Vocabulary
$34.95 retail; *Antonyms*
$54.95 retail; *Practical Vocabulary*
$59.95 each retail; *Vocabulary Adventure I, II, III*
$39.95 retail; *How To Spell*
Intellectual Software, a division of Queue, Inc.; 562 Boston Ave.; Bridgeport, Conn. 06610; 800-232-2224

Personal And Home Finance

2+2
Home management system
512K Amiga; two disk drives; printer recommended.

A home management system that features an integrated database to help organize financial transactions and daily activities for the home and small businesses.

The program can generate budget reports and related documents. It can also be used as a mailing list manager and a telephone directory.
$99 retail

Olamic Systems Corp.; 141 W. Jackson Blvd.; Chicago, Ill. 60604; 312-786-1410

D.A.S. Home Finance
Assists the homeowner in making financial decisions and in planning for future investments.
$30 retail
Developers of Advanced Software; 12455 Veterans Memorial Dr., Ste. 204; Houston, Texas 77014

Financial Cookbook
Financial analysis
The program offers 32 financial calculation "recipes" that contain formulas that produce answers about taxes, investments, savings, mortgages, IRAs and other personal finance questions.
$49.95 retail
Electronic Arts; 1820 Gateway Dr.; San Mateo, Calif. 94404; 415-571-7171

Financial Planner
512K Amiga; two disk drives; Amiga-DOS 1.1 or later; ABasiC.
A what-if planning tool for all common financial transactions with amortizations. All math, rows and columns are built in.
$100 retail; without ABasiC
$110 retail; with ABasiC
Gander Software, Ltd.; 3223 Bross Rd., "The Ponds"; Hastings, Mich. 49058; 616-945-2821

Home I, Real I, Biz I
PAR financial software
Amiga 512K recommended; two disk drives.
PAR Home I enables a home user to get a handle on major areas of personal financial management. $69 retail
PAR Real I assists a realtor or investor with several property financial management areas. $149 retail
PAR Biz I helps an accountant, executive, controller or manager with certain areas of business financial management. $149 retail
PAR Software, Inc.; PO Box 1089; Vancouver, Wash. 98666; 800-433-8433

Hardware And Peripherals

256K Memory Expansion
$149.95 retail
Skyles Electric Works, Inc.; 231-E South Whisman Rd.; Mountain View, Calif. 94041; 800-227-9998 or 415-965-1735

256K Memory Expansion
$120 retail
Starpoint Software; 122 S. Broadway; Yreka, Calif. 96097; 916-842-6183

2MB Memory Expansion
A memory device that has optional multi-function features such as a battery-

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Los Gatos, California 95030

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Hardware And Peripherals Continued

backed realtime clock, Motorola math chip socket and parity checking.
$495 retail; 512K installed
MicroBotics, Inc.; PO Box 855115; Richardson, Texas 75085; 214-437-5330

ADC-1 Data Acquisition And Control System

Measurement; monitoring hardware

An RS232 peripheral product that combines analog and digital inputs with hardwired, controlled outputs and a transmitter
$449 retail; standard model
Remote Measurement Systems, Inc.; 2633 Eastlake Ave. E, Ste. 206; Seattle, Wash. 98102; 206-328-2255

Amiga Expansion Box

Contains a fully socketed memory array to hold the full 8MB of addressable fast memory. The standard configuration of memory is 512K, and memory is expandable in increments of 512K. Eight expansion slots are available within the expansion box.
$995 retail; Expansion box, 8 expansion slots, 512K bytes of expansion fast memory (with sockets for 8MB), battery backed-up real-time clock, hard disk interface, power supply
$1,995 retail; Above plus 8MB of memory
The Gemstone Group; 620 Indian Spring Ln.; Buffalo Grove, Ill 60089; 312-537-0544

Aprotek Printers

Aprotek, see review on page 82

Black & White Digitizer

$199.95 retail
Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

The Business Partner

Hard disk drive
$2,042.95 retail; 10MB
$2,199.95 retail; 20MB
$2,504.95 retail; 40MB
The Micro Forge; 398 Grant St. SE; Atlanta, Ga. 30312; 404-688-9464

Buss Station

Features include a recessed slot; surge, spike, RFI and EMI interference; a multiport data switch; a RAM expansion port; and eight 86-pin card edge connectors.
DSI; 717 South Emporia; Wichita, Kan. 67211; 316-264-6118

Converter+

Universal interface and buffer

Provides buffer memory for a printer and interfaces parallel-to-serial or serial-to-parallel at the flip of a switch.

Memory capacity starts at 64K and is expandable to 256K, 512K or 1MB.
$229.95 retail; 64K
$279.95 retail; 256K
$179.95 retail; 0K
Johnathon Freeman Designs; 1067 Dolores St.; San Francisco, Calif. 94110; 415-822-8451

Cypress Technologies

RAM expansion boards/RAM disks

The Cypress 2MBX board is a 2MB RAM expansion board/RAM disk for the Amiga 1000 or 2000 that allows a user to use memory intensive programs.

The Cypress 2MBX unit is a self-contained 2MB RAM expansion board/RAM disk for the Amiga 1000. The board may be loaded in increments of .5MB, 1MB or 2MB, using 256K DRAM chips.

The Cypress 4MBX unit is a self-contained 3MB RAM expansion board/RAM disk for the Amiga 1000. The board may be loaded in increments of .5MB, 1MB, 2MB, 2.5MB, 3MB or 4MB, using 256K DRAM chips.
Cypress Technologies, Inc.; PO Box 3346; Fremont, Calif. 94539; 415-656-1974

Desktop_Amp, Disk_Mate

Stereo amplifier, disk drive expansion box

Desktop_Amp is a small, stereophonic amplifier. $44.95 retail

Disk_Mate is an add-on peripheral box that allows a user to use two or three external drives with the Amiga. $89.95 retail
Digital Systems Engineering; 6854 Blowing Wind Way; Citrus Heights, Calif. 95621; 916-725-3025

Easyl

Drawing pad

A pressure-activated drawing pad that allows a user to draw directly into the Amiga with a pencil.
$499 U.S. retail
Anakin Research, Inc.; 100 Westmore Dr., Unit 11C; Rexdale, Ontario, Canada M9V 5C3; 416-744-4246

The Executive

Expansion box

A two-slot, 100-pin auto configuration expansion box that sits under the Amiga monitor. It is 2.8-inches high and has a pass through for other hardware.
The Micro Forge; 398 Grant St. SE; Atlanta, Ga. 30312; 404-688-9464

GenLock Subsystem, Model RM2

Designed for professional use of the Amiga in recording studios and broadcast applications.
$850 retail
Burklund & Associates; 3903 Carolyn Ave.; Fairfax, Va. 22031; 703-273-5663

Home Controller

X-10 powerhouse controller.

Allows remote control of lights and appliances.
$139.95 retail
Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

IVS Busbox

Bus expansion box

A fully buffered bus expansion box with integral power supplies for the Amiga.

Included in Busbox are four expansion slots in a fully buffered backplane and a real-time clock.
Available September, 1986; $299.95 retail
Interactive Video Systems; 15201 Santa Gertrudes Ave., Y-102; La Mirada, Calif. 90638; 714-739-5020

IVS Ramex-1M

RAM memory expansion board

Comes with 1MB of dynamic RAM installed and is user expandable up to 8MB.
Available September, 1986; $199.95 retail
Interactive Video Systems; 15201 Santa Gertrudes Ave., Y-102; La Mirada, Calif. 90638; 714-739-5020

Megabytes/Amiga

1.05, 2.10, 4.19 or 8.39MB of memory on a single board designed to plug directly into the right side of the Amiga or to fit into the Zorro expansion box.
$599 retail; 1.05MB
$899 retail; 2.10MB
$1,099 retail; 4.19MB
$1,299 retail; 8.39MB
Skyles Electric Works, Inc.; 231-E South Whisman Rd.; Mountain View, Calif. 94041; 800-227-9998 or 415-965-1735

The Micro Forge Hardware

Memory and hard disk expansion systems
$656.95 retail; Seven Slot Expansion Box
$84.95 retail; One Slot Expansion Board
$1,134.95 retail, 10MB; $1,229.95 retail, 20MB; $1,479.95 retail, 40MB; Basic Hard Disk System
$755.95 retail, 10MB; $849.95 retail, 20MB; $1,099.95 retail, 40MB; Second Hard Drive Kit
$1,507.70 retail, 10MB; $1,582.70 retail, 20MB; $1,850.45 retail, 40MB; Standard Single Drive System
The Micro Forge; 398 Grant St. SE; Atlanta, Ga. 30312; 404-688-9464

MIDAS

Multi-instrument data-acquisition system

A data management system that combines economical microprocessor-based hardware with hardworking software.

The system collects, analyzes and displays chromatographic and spectral data; handles the input of five distinct disciplines from eight different instruments simultaneously; and displays results from all instruments immediately.
$15,000 retail
Duryea Associates, Inc.; 701 Alpha Rd.; Pittsburgh, Pa. 15238; 412-963-7262

MIDI For Amiga

MIDI interface

A standard MIDI IN, MIDI OUT and MIDI THRU interface.
$79.95 retail
Skyles Electric Works, Inc.; 231-E South Whisman Rd.; Mountain View, Calif. 94041; 800-227-9998 or 415-965-1735

MTA Series 1000.
Optical computer components
Series 1000 components will convert an Amiga to an interactive laserdisc terminal.
Available Summer, 1986
Media Technology Associates; 9208 Burning Tree Rd.; Bethesda, Md. 20817; 301-469-7060

Multiport Controller
Multiport asynchronous RS232C/RS422 port controller
The basic system consists of one DCE and one DTE port factory preset at 9600 baud, 32K bytes of RAM expandable to 192K bytes in 32K byte increments, resident FORTH or BASIC control language available on host Port 1, resident setup menu invoked by embedded control characters and non-volatile memory storage of port setups (EEPROM).
$877 retail
Component Systems, Inc.; 778-A Brannan St.; San Francisco, Calif. 94103; 415-861-1345

Okimate 20
Color printer
A ribbon-transfer color printer that allows users to print thousands of shades of color to create pictures, graphics and overheads.
$268 retail; printer and Plug 'N Print kit
Okidata; 532 Fellowship Rd.; Mount Laurel, N.J. 08054; 800-654-3282 or 609-235-2600

The Pal
Expansion chassis
An expansion chassis that features a hard disk that transfers data via true DMA into the Amiga; a hard disk controller capable of 10 megabit data transfer rate; five DMA expansion slots; 512K RAM with battery backed clock/calendar that resides on the motherboard; room for multiple storage and retrieval devices; 1 to 8MB RAM card options; optional passthrough BUSS connector for further expansion; and optional prototyping card.
Retail price depends upon configuration
Byte By Byte; 3736 Bee Cave Rd., Ste. 3; Austin, Texas 78746; 512-328-2985

Penmouse
Input device
$295 retail
Kurta Corp.; 4610 S. 35th St.; Phoenix, Ariz. 85040; 602-276-5533

Plug-compatible, Standard 256K
A compatible, standard memory expansion in heavy-duty metal cases.
$149.95 retail
MicroBotics, Inc.; PO Box 855115; Richardson, Texas 75085; 214-437-5330

Pow-R-Card
Memory expansion
An expansion board that upgrades in increments of 2MB to give a user a full 8MB of RAM. It fits all expansion boxes for the Amiga, including the new 7-slot expansion box.
RS Data Systems; 7322 Southwest Freeway, Ste. 660; Houston, Texas 77074; 713-988-5441

Scuzzy 20MB Hard Disk
A 20MB, half-height SCSI hard disk drive.
$1,495 retail
MicroBotics, Inc.; PO Box 855115; Richardson, Texas 75085; 214-437-5330

Series One
Graphics tablet
A graphics tablet that has a solid eight-degree slope and the smallest footprint in the industry. The device includes a pen, cabling, power supply and software driver.The tablet comes in three sizes: 8 ½ inch by 11 inch, 12 inch by 12 inch and 12 inch by 17 inch.
Kurta Corp.; 4610 S. 35th St.; Phoenix, Ariz. 85040; 602-276-5533

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An ADA board that allows sampling, modifying and playing back sounds. Includes executable and source code.

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Hardware And Peripherals Continued

$199.95 retail
Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

Stereo Sound Digitizer

This unit is a hardware device designed to provide digital sound capture and recording for the purpose of adding high-quality speech and special effects to programs.

The board includes stereo digitizing hardware and *Sound Editor* software.
$344.95 retail
The Micro Forge; 398 Grant St. SE; Atlanta, Ga. 30312; 404-688-9464

T-disk
20MB hard disk drive
Tecmar; 6225 Cochran Rd.; Solon, Ohio 44139; 216-349-1009

Universal Printer/Plotter Buffer
Printer/plotter accessory

Interfaces an Amiga to a wide variety of printers and plotters by providing RS-232C and Centronic Parallel interfaces on both its input and output.
$269 retail; 64K model
$329 retail; 256K model
Johnathon Freeman Designs; 1067 Dolores St.; San Francisco, Calif. 94110; 415-822-8451

Volks Omega 80
Modem

The Volks Omega 80 modem is designed for the Amiga 1000, with a custom interface that matches the Amiga's requirements.

The modem features auto dial/auto answer; user selectable pulse/tone dialing; built-in audio monitor speaker; dial tone and busy detection; and an auxiliary telephone jack.
$199 retail
Anchor Automation; 6913 Valjean Ave.; Van Nuys, Calif. 91406; 818-997-6493

Accessories

Amiga Parallel Printer Cables
$17.95 retail; 6-foot
$21.95 retail; 10-foot
Aprotek; 1071-A Avenida Acaso; Camarillo, Calif. 93010; 805-987-2454

Belkin Accessories
$18 retail; Amiga parallel printer cable
$99 retail; two-way parallel data switch
$129 retail; four-way data transfer switch
Belkin Components; 4718 W. Rosecrans Ave.; Hawthorne, Calif. 90250; 800-223-5546 or 213-644-3184

Hippo Clean

A disk cleaning kit for 3½-inch drives.
$29.95 retail
Hippopotamus Software, Inc.; 985 University Ave., Ste. 12; Los Gatos, Calif. 95030; 408-395-3190

IVS Magnus
Computer audio system

A complete audio system designed for use with microcomputers.
Available October, 1986; $99.95 retail
Interactive Video Systems; 15201 Santa Gertrudes Ave., Y-102; La Mirada, Calif. 90638; 714-739-5020

MTA 200
Stereo sound system

This compact stereo amplifier with speakers will give Amiga owners stereo sound using a minimum of desk space.
$79.95 retail
Media Technology Associates; 9208 Burning Tree Rd.; Bethesda, Md. 20817; 301-469-7060

Universal Interface Converter
Interface conversion

Interfaces serial-to-parallel or parallel-to-serial at the flip of a switch.

A user can choose any of 16 standard baud rates to match a computer, printer or other serial peripherals. A bank of switches allows a user to set the rate from 50 baud to 19.2K baud.
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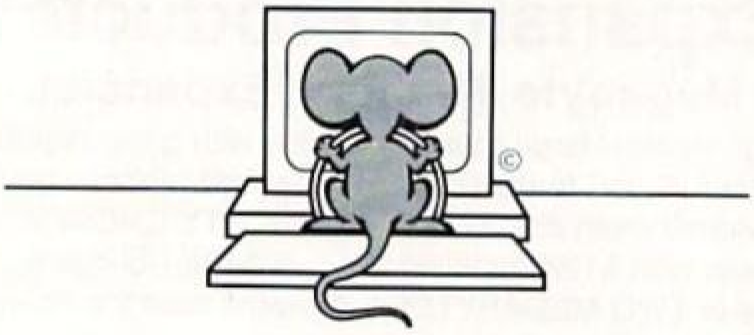

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B.E.S.T. has hatched the new Amiga Business Management software to manage inventory, receivables, payables, order processing, general ledger...all in one.

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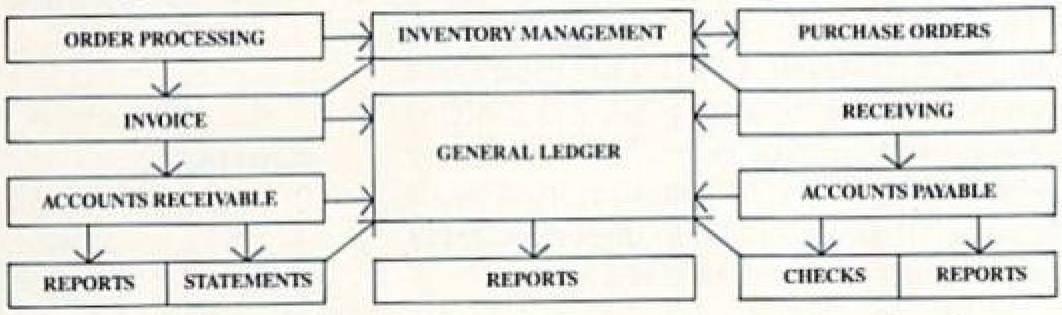
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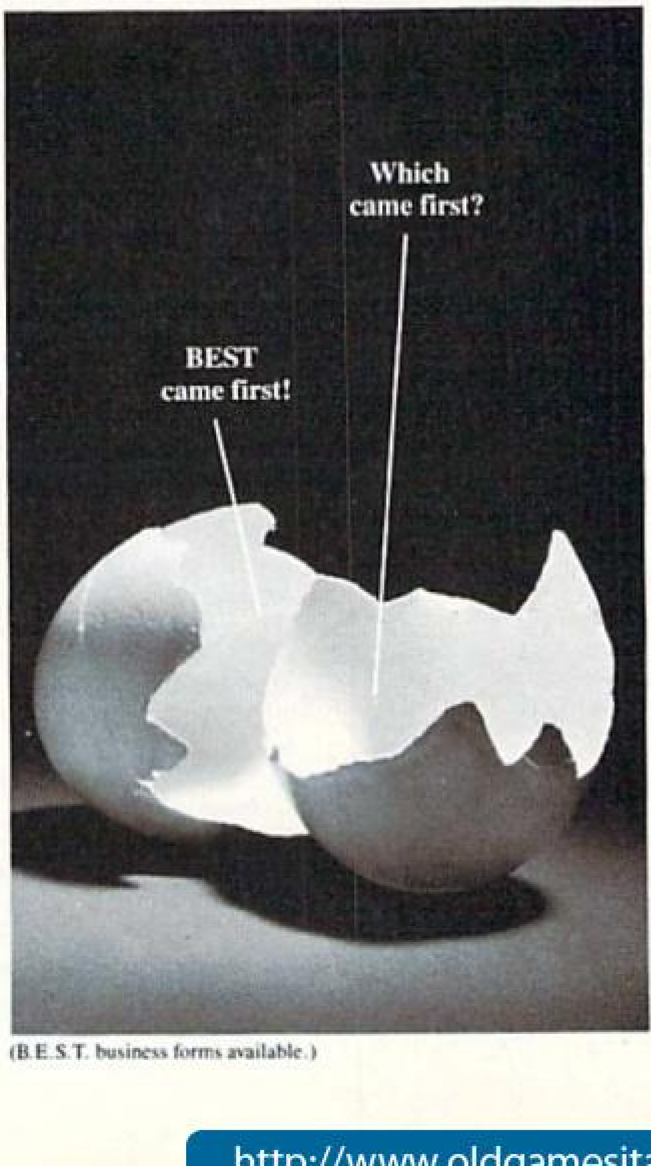
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came first?
BEST
came first!

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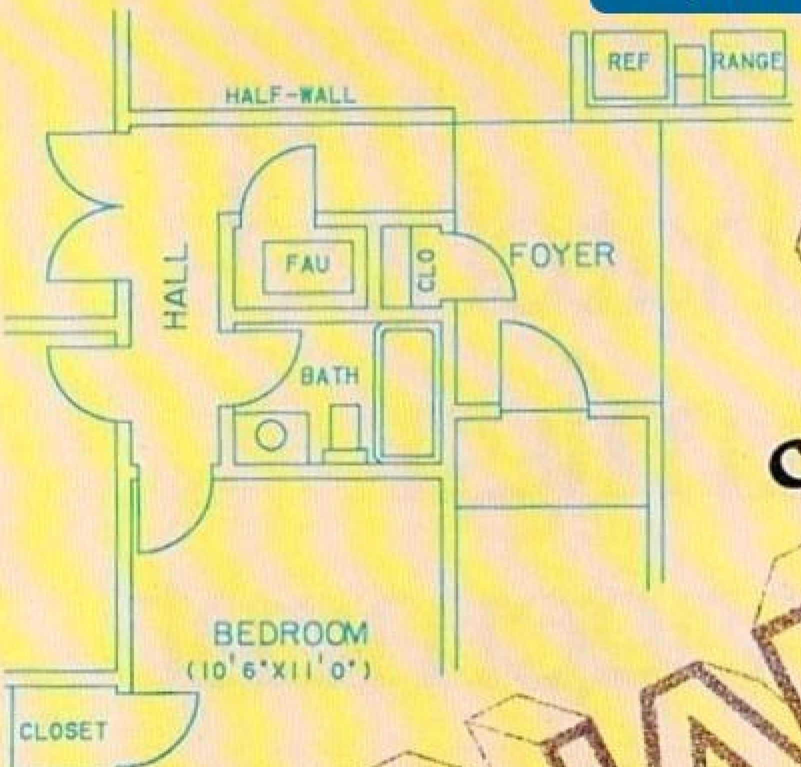

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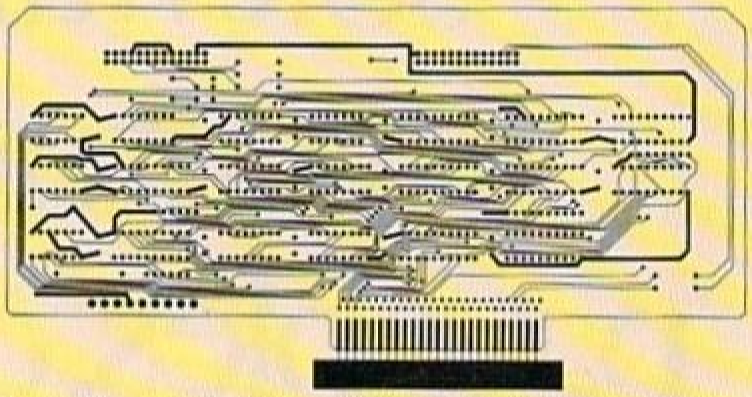
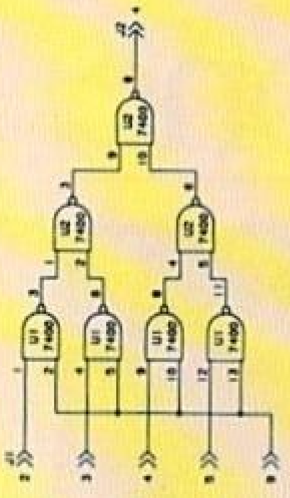


PRINTED CIRCUIT ARTWORK



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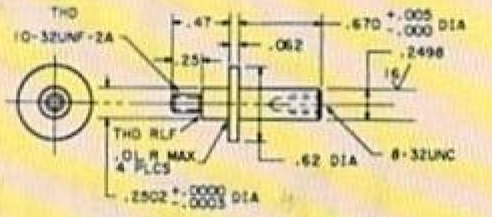
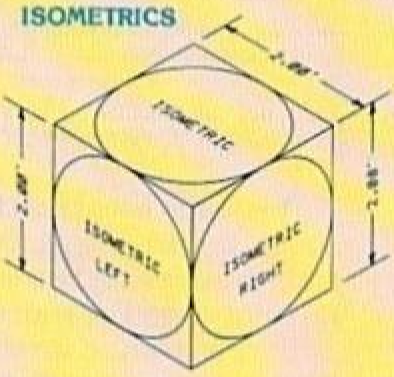


MECHANICAL DRAFTING

ISOMETRICS



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S0001	U1	1		7400
S0002	J1	3	*	CON
S0002	U1	4		7400
S0003	J1	4	*	CON
S0003	U1	9		7400
S0004	J1	5	*	CON
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S0005	J1	9	*	CON
S0005	U1	2		7400
S0005	U1	5		7400
S0005	U1	10		7400
S0005	U1	13		7400
S0006	U1	3	*	7400
S0006	U2	1		7400
S0007	U1	6	*	7400
S0007	U2	2		7400
S0008	U1	8	*	7400
S0008	U2	4		7400
S0009	U1	11	*	7400
S0009	U2	5		7400
S0010	U2	3	*	7400
S0010	U2	9		7400
S0011	U2	6	*	7400
S0011	U2	10		7400
S0012	U2	8	*	7400
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JIFFIES/MAD POET

Continued from pg. 64

```
    :IF RIGHT$(W$,1)="-"THEN PRINT"
    [LEFT]";'ITTF
115 IF X=5 THEN 125'DFJE
120 FOR T=1 TO 5-X:READ W$:NEXT'GIOC
125 RETURN'BAQC
135 POKE V,15:POKE S2,N%(W)
    :POKE S3,N%(W):FOR U=1 TO N%(W+1)
    :NEXT'IHDP
140 POKE V,0:POKE S2,0:POKE S3,0
    :IF N%(W+2)=-1 THEN W=0
    :RETURN'KYJK
145 W=W+2:RETURN'DEEH
150 PRINT MID$(A$,T,1);:GOSUB 135
    :RETURN'EONF
200 DATA WE,I,HE,THEY,SHE'BQPA
205 DATA WENT,RAN,FLED,FLEW,
    SOARED'BANI
210 DATA WANDERING,GIBBERING,
    SCUTTLING,TREMBLING,
    SHUDDERING'BASL
215 DATA ACROSS,ALONG,INTO,ABOVE,
    BELOW'BERK
220 DATA THE,THIS,SOME,A,THAT'BUQD
225 DATA SPARKLING,GLITTERING,
    SHIMMERING,TOWERING,RAVISHING'BACL
230 DATA STRAND,LAND,BAND,HAND,
    STRAND'BDAH
235 DATA OF,OF,OF,OF,OF'BOCI
240 DATA SAND-,MAD-,DARK-,BRIGHT-,
    DEATH-'BGII
245 DATA STARS,KINGS,CLOUDS,WINGS,
    MEN'BDJN
250 DATA SET,DRUNK,DROWNED,FLAT,
    LEFT'BCIJ
255 DATA IN,ON,BY,NEAR,IN'BQPK
260 DATA THE,THIS,SOME,A,THAT'BUQH
265 DATA SEA,LEA,TREE,KEY,SEA'BUHM
270 DATA FROM,BY,WITH,OF,FROM'BUHJ
275 DATA THE,THIS,SOME,A,THAT'BUQN
280 DATA SHREIKING,SINKING,HOLLOW,
    MERRY,SORDID'BMTP
285 DATA LAND,MAZE,PLACE,BOX,CAGE'BYUP
290 DATA OF,OF,OF,OF,OF'BOCJ
295 DATA KINGS,LORDS,MINDS,HORDES,
    DOGS'BEJS
300 DATA SO GRAND,COMMAND,DEMAND,
    IN SAND,REMAND'BLRH
305 DATA THAT,SO,WHEN,SO,THAT'BULI
310 DATA THEY,ALL,WE,ALL,THEY'BUTD
315 DATA LIVED,DIED,ATE,GREW,
    SHONE'BAWK
320 DATA BY,FROM,ON,BY,FROM'BSJE
325 DATA THE,THE,THE,THE,THE'BTBJ
330 DATA FOREVER,ALIEN,SMOLDERING,
    WALLOWING,SIMPERING'BTLN
335 DATA TREE,SCREE,SEA,TEA,TREE'BXIL
345 DATA 217,400,227,400,227,200,217,
    400'BGKM
350 DATA 213,400,234,200,234,200,227,
    400'BGBI
355 DATA 223,400,230,400,230,400,217,
    400'BGWN
360 DATA 213,600,-1,-1'BNNF
```

END

PRESS F3 FOR HELP F7 WHEN FINISHED
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657
30
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Graphics Excellence

An in-depth look at three graphics programs for the Amiga from Aegis Development, Inc.

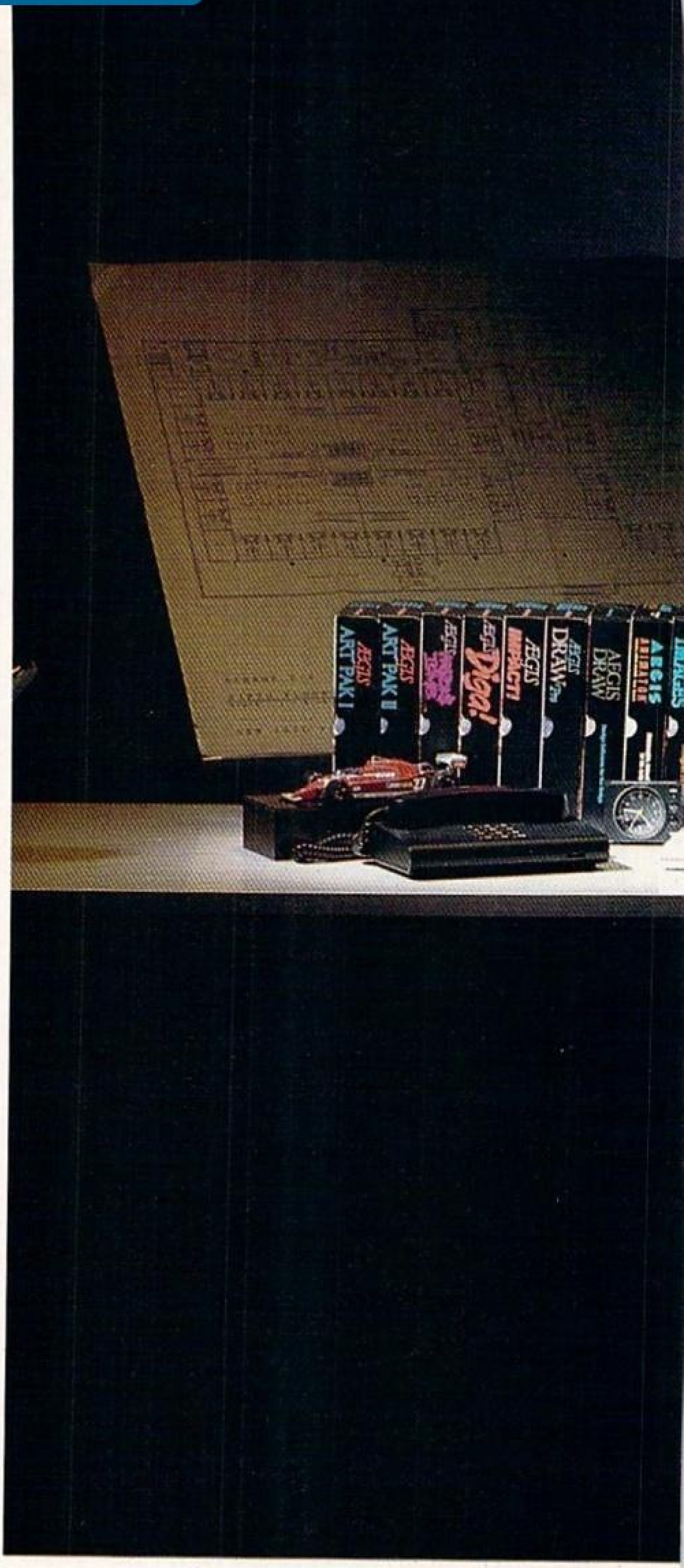
BY LOUIS R. WALLACE

The latest entries into the Amiga graphics arena are three programs from Aegis Development Inc., a company out of Santa Monica, California. *Aegis Images, Aegis Animator* and *Aegis Draw* offer a little something for everyone. *Aegis Images* is a paint program, *Aegis Animator* is an animations and storyboard program, and *Aegis Draw* is a computer-aided design (CAD) package. *Aegis Images* comes packaged with *Aegis Animator* or can be purchased alone.

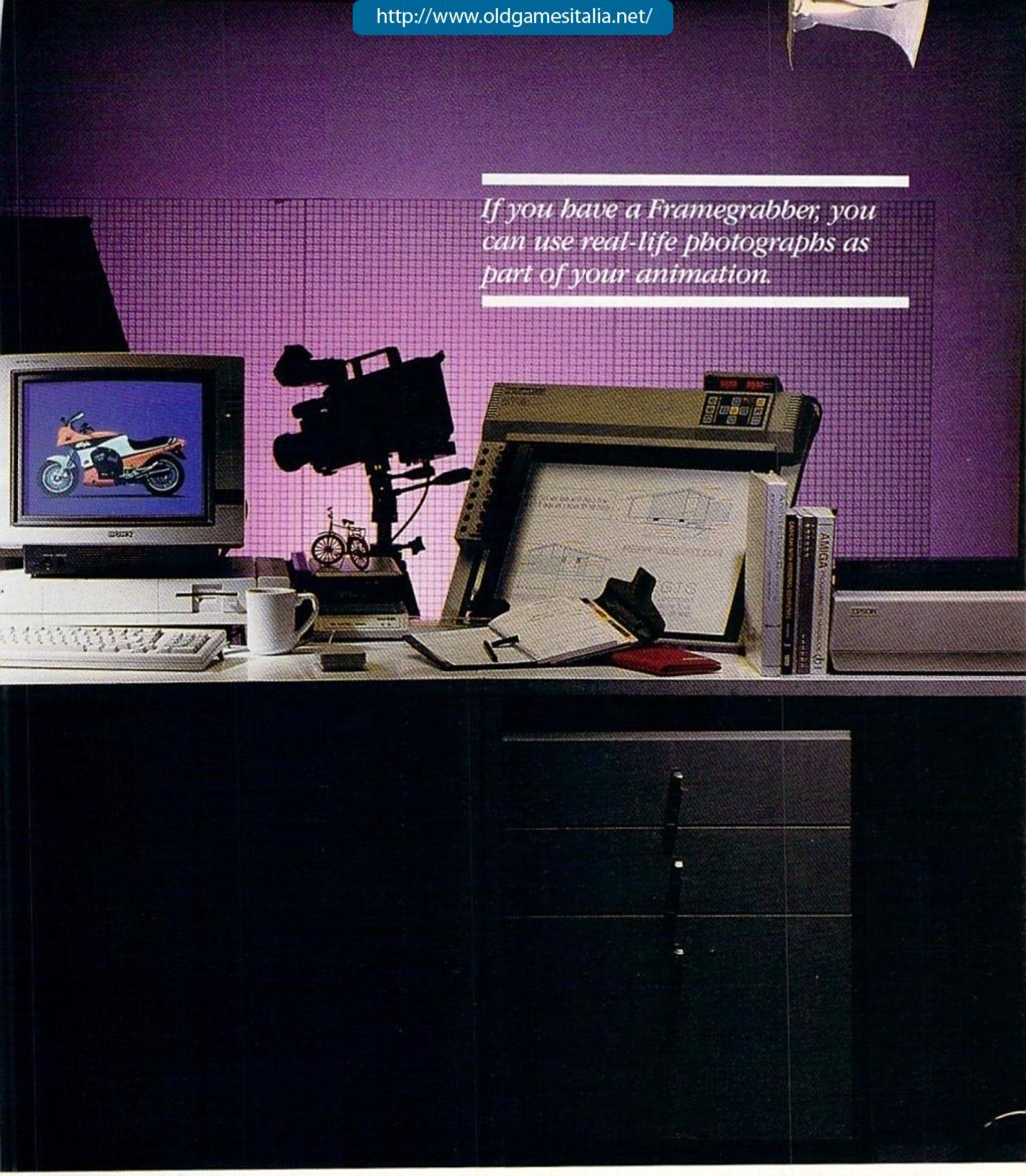
Aegis Images

Aegis Images is a high-powered paint system that implements more special features than any previous Amiga graphics package. It was designed not only for professional artists, but for anyone who needs powerful design. You can use as many as 32 colors in one painting and choose from 20 different brushes and 16 patterns.

Like other Amiga graphics systems, *Aegis Images* uses the Intuition pop-down menus to control and select the painting options. It operates in low (320x200, 32-color) and medium (640x200, 16-color) resolutions. It does not support interlaced (640x400) mode.



The program has all the standard functions for drawing (lines, circles, boxes). In fact, the drawing tool sections contain almost every drawing option you can imagine. And it has the best pattern fill I have ever seen, allowing you to design colored patterns

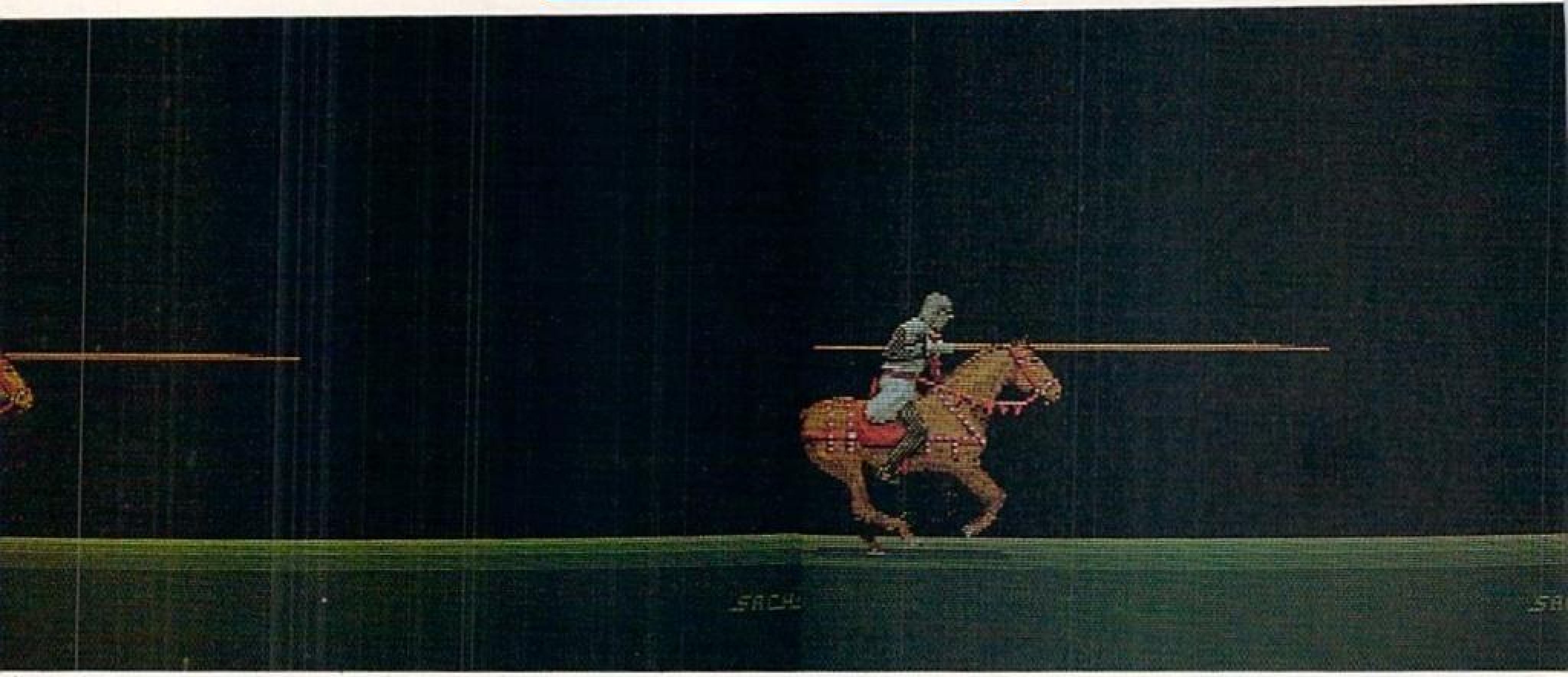


If you have a Framegrabber, you can use real-life photographs as part of your animation.

and filling an area with a pattern as fast as other programs take just to fill color alone.

The program shines in special effects. Besides offering the standard ones like mirror image, cycle draw and cycle color, it lets you define any area of the screen as a brush using the Frame command. Frames can be resized, rotated, or saved to disk as separate reusable windows.

In addition, *Aegis Images* offers several other powerful options that allow you to create paintings in



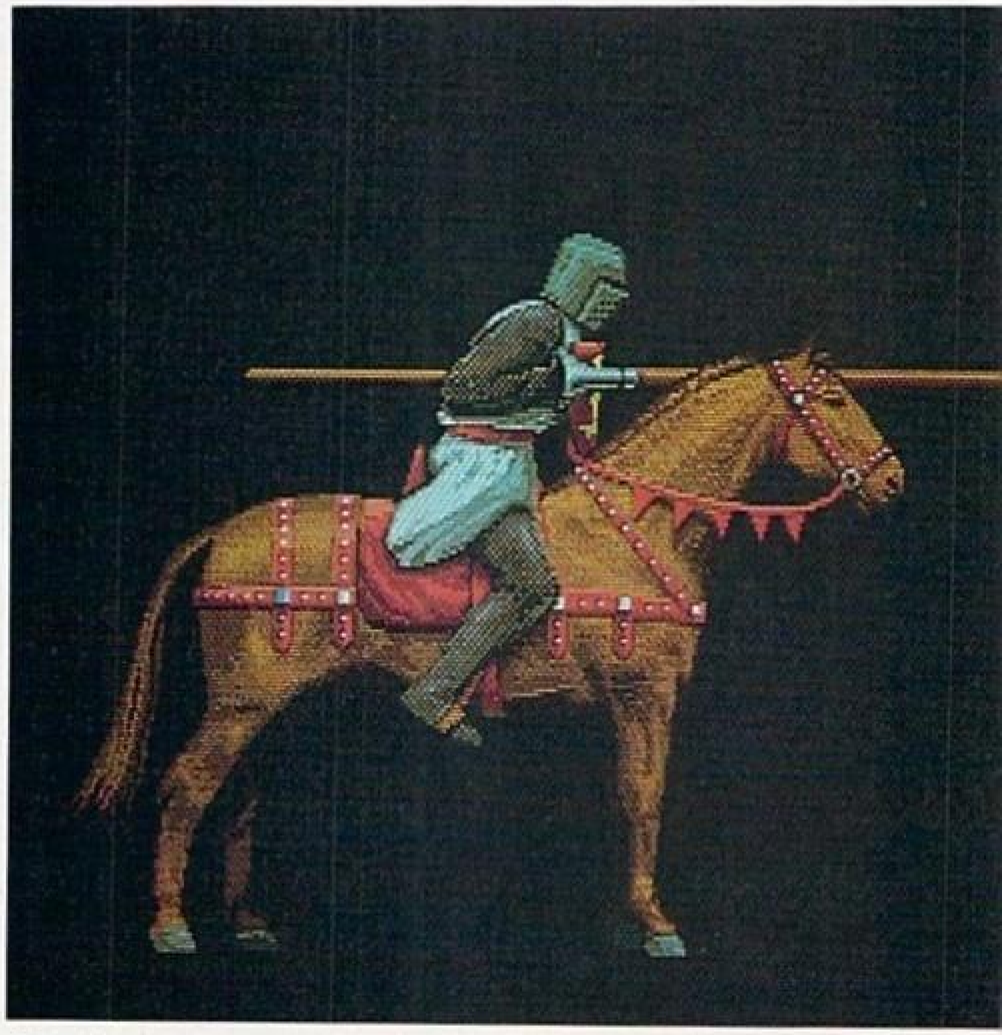
Aegis Draw *is the kind of package that makes people buy a computer just so they can use a piece of software.*

minutes. The Wash command uses a brush of your choice to blend lines and colors together to create subtle effects, similar to mixing water colors. You can also draw using the Mirrors command, which reflects your design into up to four quadrants.

Another special effect is Pantograph. This option duplicates one area of the screen to another. What makes it unique is that you cannot see the duplicated area until you paint over it. This gives the area an illusion of its being uncovered, and produces quite striking effects.

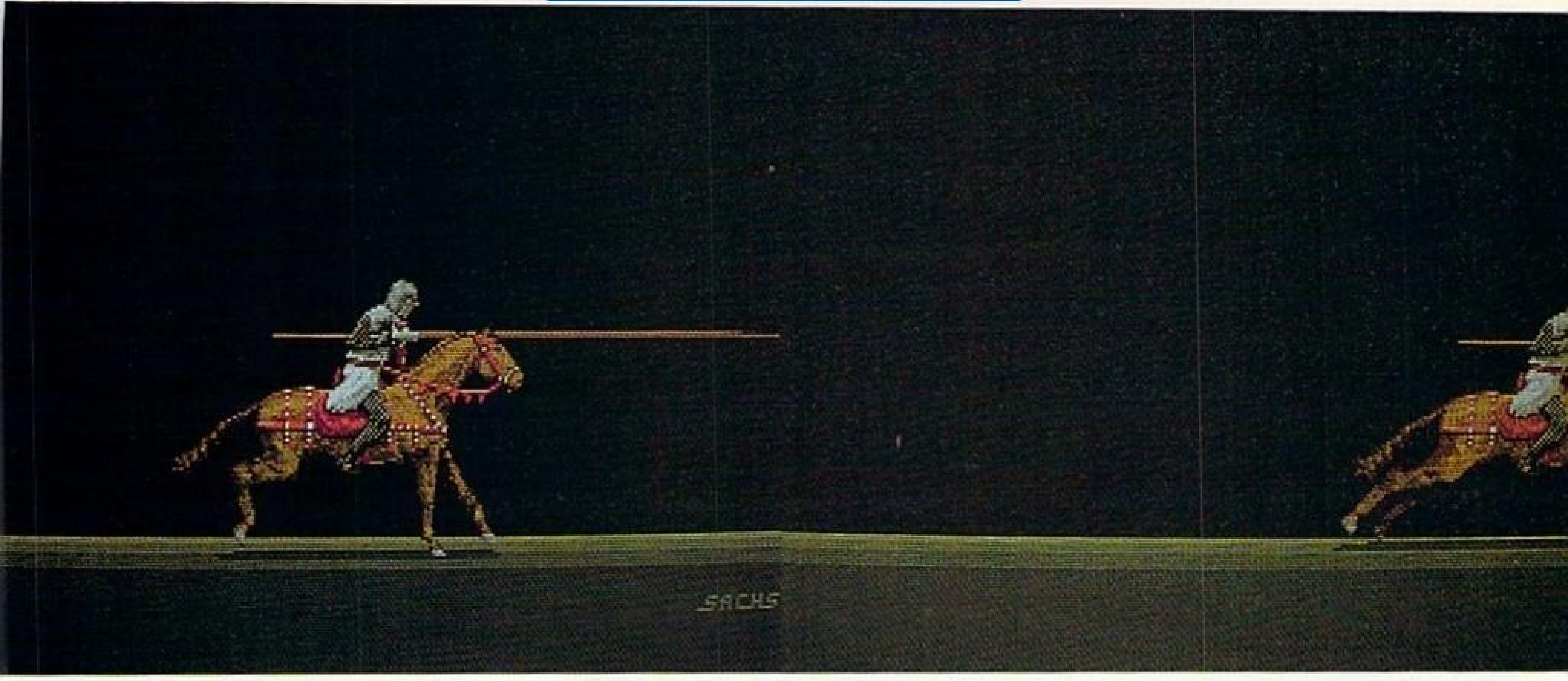
My favorite special effect is the Spread option. This is an enhanced form of area fill, but allows you to fill with a range of colors. You create the range of colors you want, using from 2 to 32 colors. You can also select the degree of dithering (mixing) you want and how it is to be applied (horizontal, vertical or by lines).

Equally unusual is the Under option. This option lets you pick colors that cannot be painted over. When you attempt to paint over them, it gives an illusion of painting under them. Other special effects are Antialias, which smoothes the edges of shapes, automatically blending two areas together; Grid, which provides precision in drawing; and Constrain, which allows lines to be drawn only at specific angles.



Aegis Animator

Aegis Animator is an animation package that creates different shapes on the screen and then animates them. *Aegis Animator* is a cross between a CAD system and a cartoonist's studio. You create the animation by designing "tweens," or segments of time. Each tween is added to, altered, moved or modified from preceding tweens, so when the sequence of tweens is played, the effect is



For cel animations, you design the individual components with Aegis Images *and save them as windows. These windows are then loaded into* Aegis Animator *and used as animation sequences.*

fluid. Additionally, *Aegis Animator* lets you control the shade of a color or the speed at which the animation runs.

Your animation is created using two different methods: cel animation and metamorphic animation. Cel animation is the one traditionally used by animators. Each frame of the animation is created by drawing, and the frames are then combined. In metamorphic animation, you create one image and continuously modify it. This method requires less memory, but limits the detail.

For cel animations, you design the individual components with *Aegis Images* and save them as windows. These windows are then loaded into *Aegis Animator* and used as animation sequences. For metamorphic animations, you use the program's drawing functions (lines, polygons, circles, blocks and stars) to create your objects, then move or modify them.

You can move your objects up, down, left or right. Or you can move them in or out of the screen plane to create an illusion of three dimensions. In addition, the program lets you rotate the objects around the X-axis or the Y-axis, or modify the size. You can work with a single object, groups of objects, all the objects, or a piece of an object.

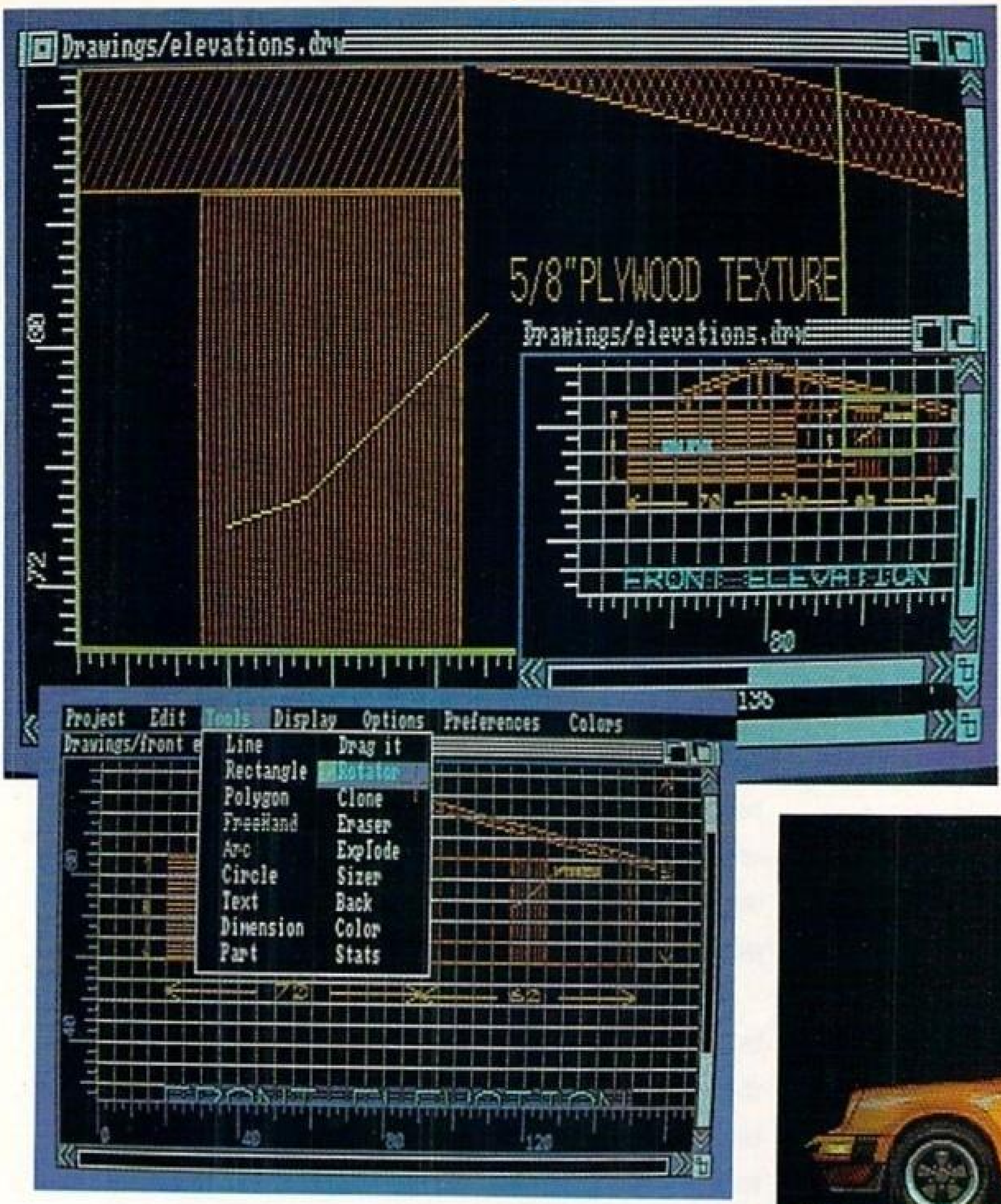
You can alter an object using the Morph functions by converting it to a series of segments and moving them to other points. For instance, if the object were a bird, you might want to bend, stretch and pull the wing to any screen location. All the changes are saved within the tween you are in. You can also add segments to an existing object, so it can be molded into a completely different object. You can change it all at once or as a series of changes.

Animation sequences can then be combined with background pictures, provided the background has been created with a graphics system that uses the Amiga IFF format (*Aegis Images, DeluxePaint, Graphicraft*). And if you have a framegrabber, you can use real-life photographs as part of your animation. Or by combining your sequence with a genlock device, you can combine video and animation to make films.

Aegis Images and *Aegis Animator* bundled together retail for $139.95. *Aegis Images* alone retails for $79.95.

Aegis Draw

Aegis Draw is a full-featured CAD package. This is the kind of package that makes people buy a computer just so they can use a piece of software. It lets you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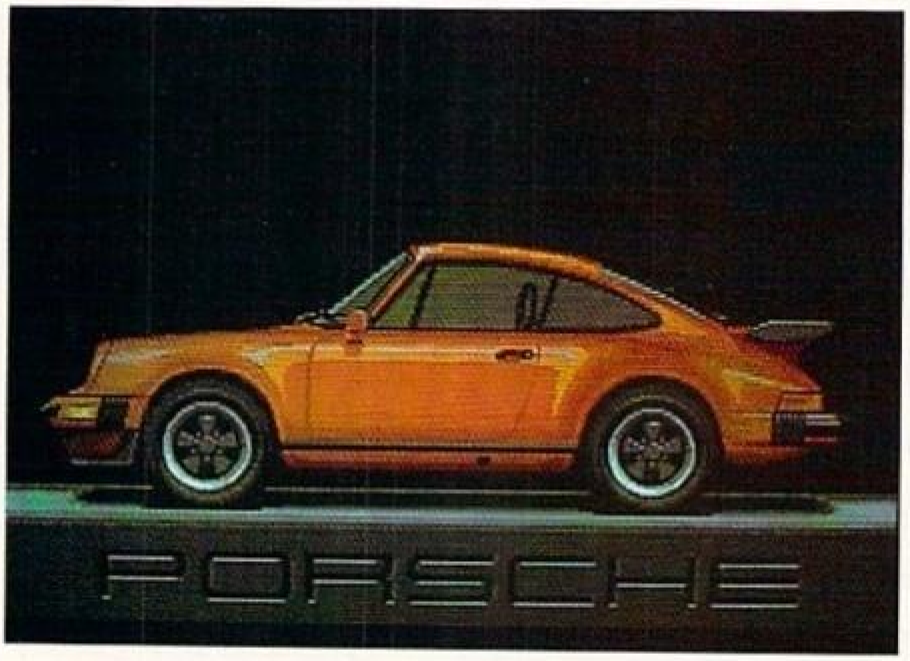
FreeHand
Arc
Circle
Text
Dimension
Part
Drag it
Rotator
Clone
Eraser
Explode
Sizer
Back
Color
Stats
40
80
120

With Aegis Images *and* Aegis Animator, *create animated illustrations, titling, advertising, teaching and instruction material, movement design for screenplays, and videos.*

create accurately scaled drawings of things like building plans, mechanical equipment or circuit designs. It retains its accuracy by maintaining a data base of the shapes of individual elements. This gives a CAD system much more precision than a paint system in the way it handles these elements. For example, if you want to move a section of an image created with a paint program, you box it, and move the whole boxful. With a CAD system like *Aegis Draw*, however, you can be much more precise. So if you have an irregular shape, you can move it exactly as it is, in that shape, without having to take a boxful of background along with it.

Aegis Draw uses the Amiga Intuition operating system, so if you are already familiar with Amiga software, you will be very comfortable. But if you are new to the Amiga, you will still find the mouse/menu approach to controlling a program easy to get used to.

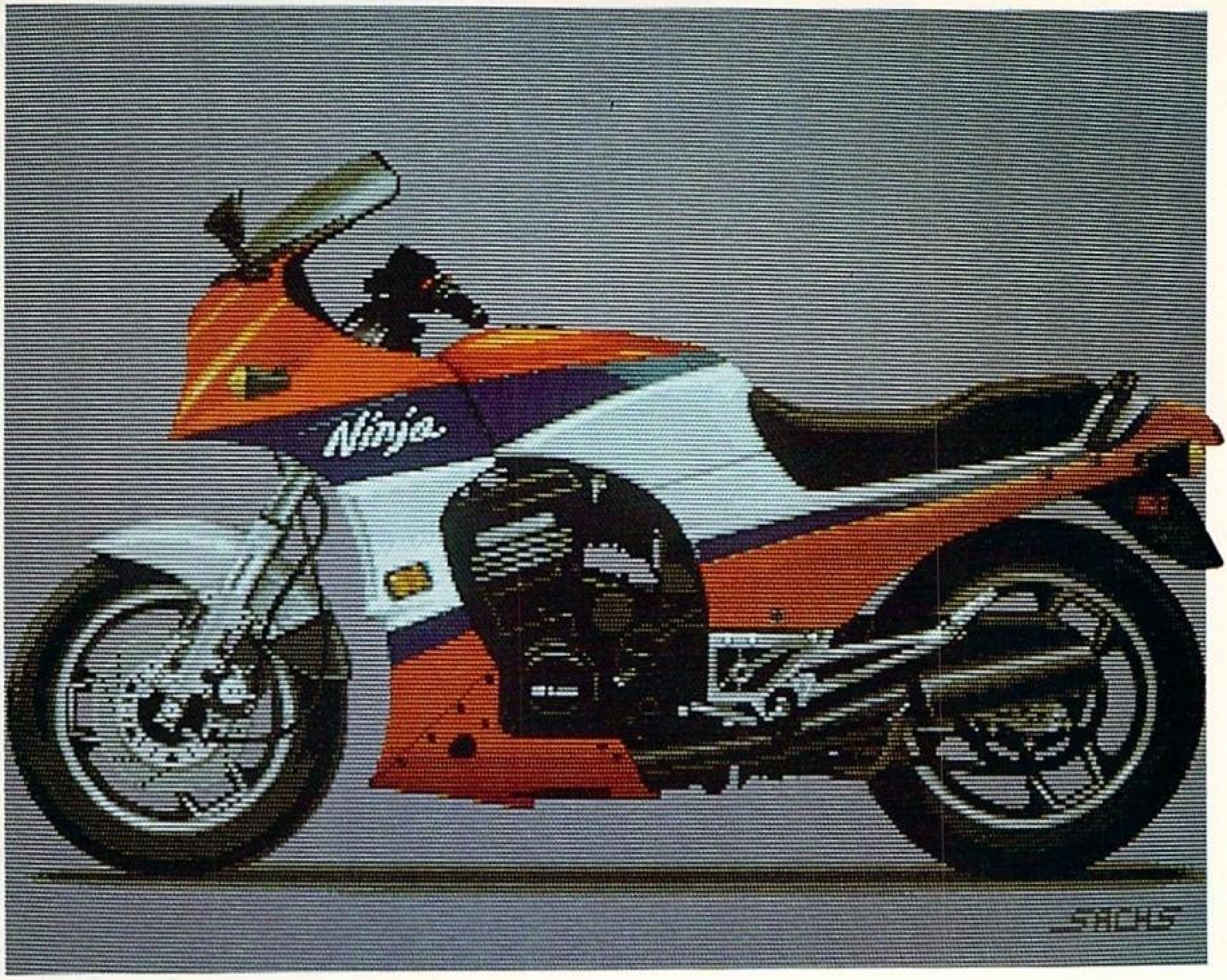
The program's screen format is gridded drawing paper bounded on the left and bottom with rulers. You



use the drawing area just as you would paper, except that the drawing tools are computerized. Lines are drawn at a rate of one million pixels per second. If you decide that the line needs to be moved to the right a half inch, choose the Drag Object option.

In drafting, you often need to know the distance between two points. With *Aegis Draw*, you choose the Dimension option from the Tool menu, point to the two points you're measuring the distance between, and the program will instantly calculate the distance.

If you want to rotate part of an object, choose the Rotate option. It is that simple. *Aegis Draw* has many different tools to work with—tools like lines, arcs, circles, rectangles, and text. You can draw with different size lines or use patterned lines. You can even fill an area with patterns, and the data base will note that



this area contains a pattern.

Aegis Draw allows you to have several drawings on the screen at once. On a 512K Amiga, you can have two, each in its own window. By adding extra RAM you can have even more. You can also Zoom into a drawing, edit it, and Zoom back out. There are many other sophisticated options, such as re-sizing an object or group of objects, Exploding a drawing into components, or even Cloning objects.

One nice feature is the program's ability to determine ruler units. They can be in inches, meters, millimeters, feet or any other unit you desire. An even better feature is Parts. Parts allows you to work on only small pieces of drawings at one time. A professional who needs advanced CAD will really appreciate this.

Of course, the program would be useless without the ability to export the drawing to some kind of printer. *Aegis Draw* is compatible with a number of different plotters, including multipen plotters, and hard copy via dot matrix is supported. You can also use other controllers for drawing besides the Amiga mouse, such as the Kurta digitizing tablet.

For people who require professional-level CAD, *Aegis Draw* may well be the program you are waiting for. Priced at $199.95, it is relatively inexpensive. And because of the advanced nature of the Amiga, many of the features of *Aegis Draw* do not even exist in other more expensive MS-DOS CAD systems.

All in all, I highly recommend these three programs. They provide a cost-effective approach to professional results. With *Aegis Images* and *Aegis Animator,* create animated illustrations, titling, advertising, teaching and instruction material, movement design for screenplays, and videos. And with *Aegis Draw,* take advantage of features found in more expensive CAD packages for a fraction of the price. In addition, because these programs are not copy-protected, they can be installed easily on a hard drive for even faster operation. ■

A Map-Hater's Guide to Adventure Games

BY SHAY ADDAMS

Are you tired of meticulously mapping every new world you visit in an adventure game? Bored by having to draw dozens of little boxes, lines and arrows that make absolutely no sense whatsoever the very next day? So are a lot of people. Maybe that's why some contemporary adventures make map-making far less tedious than older games—some even letting you throw away the pen and paper altogether. These games free your mind to concentrate on more entertaining aspects of the adventure—things like character interaction, plot, and what to do with that weird purple thing you just uncovered in the Lost City. If you'd prefer to focus on the adventure instead of the map in your next game, try one of these quests. But don't think that just because it's easy to map, it will be easy to solve.

Games with Maps

An all-text science fiction story by Michael Berlyn, Infocom's *Suspended* takes place in an underground complex where you direct the actions of five robots. To help you keep track of which robot is where, the game includes a fold-up board bearing a color map of the complex. Plastic markers representing the robots can be temporarily stuck to the board and easily removed when your character moves to a new room. No mapping at all is required in this advanced puzzler.

Another Infocom adventure, *Wishbringer*, is a fantasy scenario in the *Zork* tradition. You are given a big map of the town, which proves essential for solving one of the puzzles. The main streets and buildings are clearly depicted, so you'll only have to map a few locations. It's an excellent introduction to text adventuring.

For a mystery that combines text with atmospheric sound effects and other special graphic touches, you might try Avalon Hill's *Ripper*. The game includes a map of the mansion where Jack the Ripper is murdering the guests and maids during a party attended by Houdini, Sherlock Holmes and other famous people from 19th-century England. It's an intermediate-level skullbuster, with just a few secret locations that don't appear on the map.

Novice-level games designed for young adventurers, *Seastalker* by Infocom and *Below the Root* by Spinnaker, are also packaged with maps as part of the documentation. An all-text game, *Seastalker* takes place aboard a mini-submarine inside an underwater research lab. The 32 locations are laid out in detailed floor plans. It's an exciting story with a James Bond-style climax, and clue cards are also provided. *Below the Root* is a fairy tale-type story (novice level) that comes with a partial map you can complete as you progress. The landscape isn't confusing or extensive, so this is never a problem.

Linear Plots and Paths

Some games are designed to minimize or eliminate the need for mapping. In Spinnaker's *Perry Mason,* for example, most of the game takes place in a courtroom as you defend your client on a murder charge. Instead of you going out to search for clues, you send your private eye. And, in Spinnaker's *Nine Princes in Amber,* a fantasy in which you must regain your memory and become king of the land of Amber, there is minimal mapping. These kinds of straightforward plots are referred to as linear plots. Both *Perry Mason* and *Nine Princes* are intermediate-level.

In Spinnaker's *Amazon,* you select one of three difficulty levels before seeking the Lost City of Chak in the jungles of South America, and in Spinnaker's *Treasure Island,* the classic pirate tale told with great graphics and music, the plots are linear. A more contemporary pirate story, *Cutthroats* from Infocom, is an all-text game that can be completed without drawing a single line. Most of the action takes place on a rather small island and one of two sunken ships, so there aren't a lot of places to get lost. And it's really two games in one: After you find the treasure on one ship, you can restart the program and dive for the other wreck.

Let Your Computer Do the Mapping

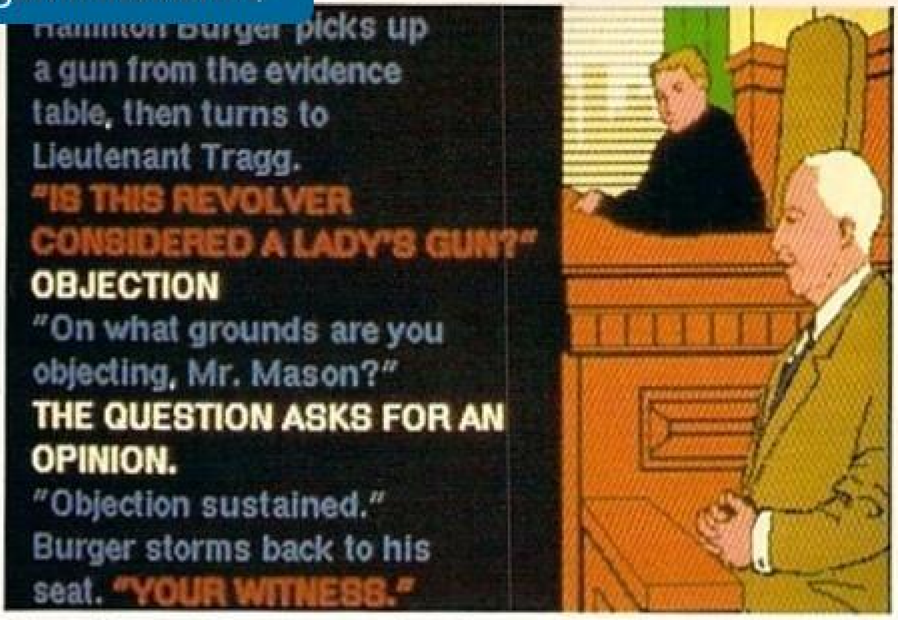
But the best adventures for map-haters are those that draw the maps on-screen. When you say "look map" in Spinnaker's *Swiss Family Robinson*, you see a full-screen map that is blank at the beginning of the game, and as you move around, it is filled in with details of the terrain. A blinking cursor shows your current location. This intermediate game also has a built-in clue feature. Electronic Arts' *Heart of Africa* accomplishes the same feat with icons and windows, and you can view different maps to see where you've been or to locate hard-to-find places in your quest for the tomb of the Egyptian Pharoah Ankh Ankh.

In *Phantasie* and *Phantasie II*, both by Strategic Simulations, the dungeons are shown on the right side of the screen, with a blinking cursor representing your party of orc-slaying map-haters. Each time they move, the map is filled in to show the hall or room they just entered, so you never have to draw one. It might help to take notes, however.

The dungeon-mazes of Origin Systems' *Ultima* games can be quickly mapped if you use a magic gem and the "peer" command. The entire floor plan is displayed, with treasures and traps marked, so you can copy or trace if off the screen. *Ultima*'s surface, however, must still be mapped. *Ultima II* is the hardest to map because it involves time travel. Except for the *Ultimas*, which are for advanced players, these are all intermediate-level games.

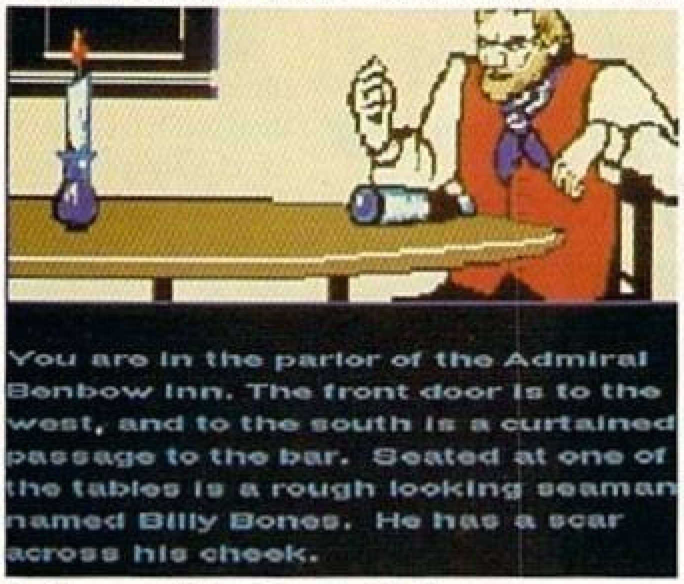
Moebius, also from Origin Systems, makes the most of having the computer do the mapping. Built-in maps can be unscrolled across the screen by selecting this option from a pull-down menu. Some show all the buildings of the land of Khantun, others point out where to find water or people, and one map has a flashing cursor that pinpoints your location and shows the areas already explored. It's another quest-for-the-evil-wizard scenario, but one set in the Orient with *Karateka*-style action and *Ultima*-style magic. This is an advanced-level role-playing game.

So whether you're a first-timer or an adventure veteran, there are plenty of games that de-emphasize mapping. As the computer's amount of RAM and disk space increases, you can expect to see more adventures with "auto-mapping" features like those seen in *Moebius* and



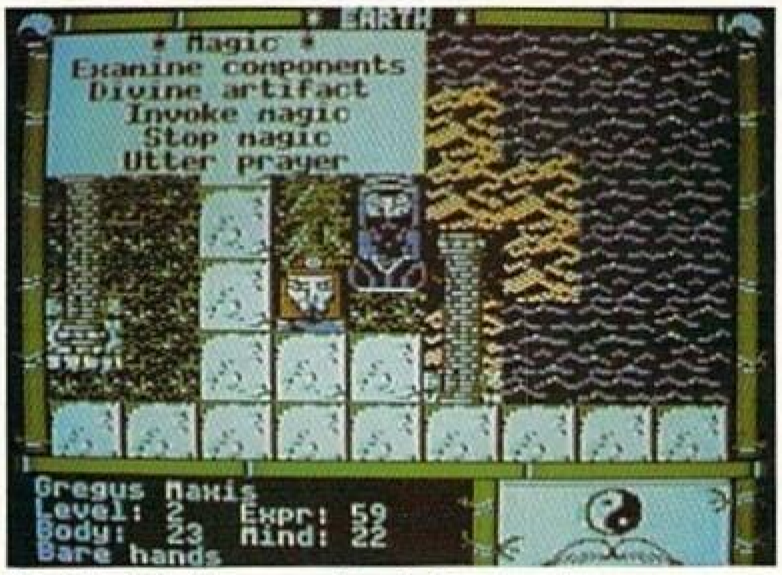
Hamilton Burger picks up a gun from the evidence table, then turns to Lieutenant Tragg.
"IS THIS REVOLVER CONSIDERED A LADY'S GUN?"
OBJECTION
"On what grounds are you objecting, Mr. Mason?"
THE QUESTION ASKS FOR AN OPINION.
"Objection sustained."
Burger storms back to his seat. "YOUR WITNESS."

Perry Mason **takes place mainly in a courtroom.**



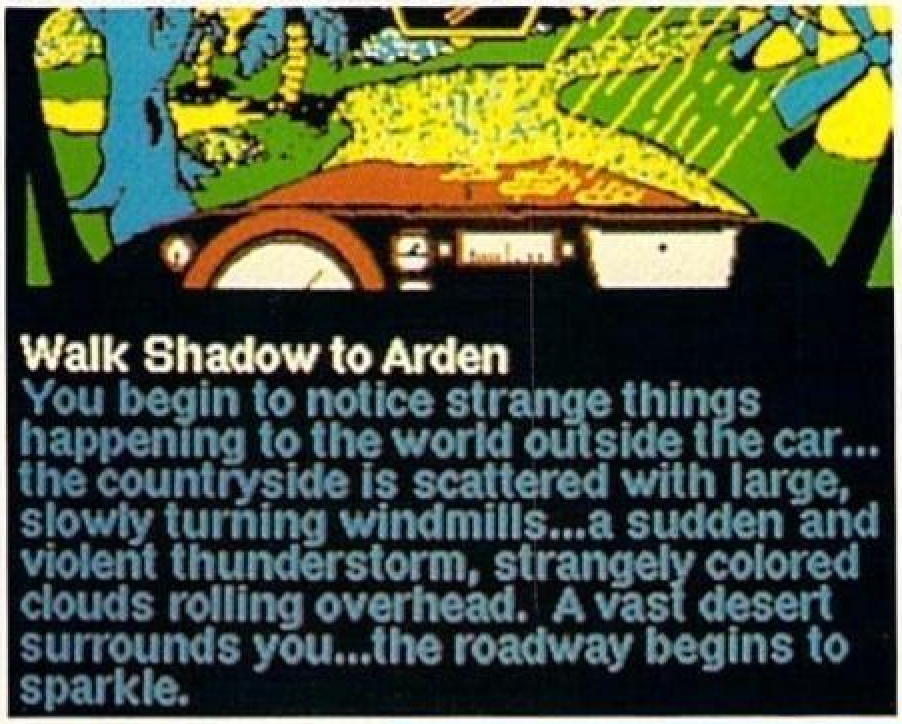
You are in the parlor of the Admiral Benbow Inn. The front door is to the west, and to the south is a curtained passage to the bar. Seated at one of the tables is a rough looking seaman named Billy Bones. He has a scar across his cheek.

In *Treasure Island* the plot is linear.



Gregus Maxis
Level: 2 Expr: 59
Body: 23 Mind: 22
Bare hands

Moebius **lets the computer do the mapping.**



Walk Shadow to Arden
You begin to notice strange things happening to the world outside the car... the countryside is scattered with large, slowly turning windmills...a sudden and violent thunderstorm, strangely colored clouds rolling overhead. A vast desert surrounds you...the roadway begins to sparkle.

There is minimal mapping ***Nine Princes in Amber*****.**

More Than Star Wars

Part 1: The Road to Eidolon

BY JOHN JERMAINE

In this rare look behind the doors of the Lucasfilm Games Division, four programmers talk about fractal theory and how they use it to create exotic graphic effects.

Formed in 1982, the Games Division at Lucasfilm, Ltd. has the distinction of being both the youngest and smallest division of the company. And although the programmers in the Games Division are, like their division, young, they are definitely not small in the way they think about their work.

The programmers who participated in this interview—Chip Morningstar, Charlie Kellner, Gary Winnick and Kevin Furry—worked on the Lucasfilm games *Ballblazer*, *Rescue on Fractalus*, and *The Eidolon*.

We began by talking to Chip Morningstar, the utility programmer of the group.

Jermaine: Chip, tell us a little about your background.

Morningstar: I received my degree in computer engineering from the University of Michigan. For the next few years, I worked on projects which were self-aiming. I was involved in Project Xanadu, a special Silicon Valley group developing hypertext systems. Before that assignment, I wrote image-processing software at a research lab in Ann Arbor, Michigan. My career at Lucasfilm began in 1984, and my job was to develop software tools as the group needed them.

Jermaine: What computers do you work with at Lucasfilm Games?

Morningstar: Basically we work with two computer systems. The group uses four Sun Microsystems 68000 workstations, running the 4.2 BSD Unix® operating system. We try to keep no more than two or three people using one of these systems at a time, because they tend to slow down with heavier use.

We also use a DEC Vax 11/750 computer for our development work. Now that we have the Suns, it's used mostly for electronic mail and word processing. The Vax also runs the same operating system as the Sun workstations. Information is transferred between our various computers over a commercially available network called Ethernet.

Jermaine: What programs do you work with?

Morningstar: Since we're using Unix, we have access to hundreds and hundreds of utilities which are a standard part of that system. In addition, we have a few dozen utilities of our own concoction, which we use for various purposes. The nature of Unix is such that one is encouraged to write lots of small special utilities to do specific, well defined tasks, rather than to write a few large complicated general ones.

Our assembler is called Macross. It has higher-level features like structured flow-of-control statements (if-then-else, do-while) at both the run-time and assembly-time levels. The program also contains extensive assembly-time dynamic storage management and string manipulation features. Macross does have one drawback though. It tends to trade off some speed for higher-level performance.

Jermaine: The main subject of this interview is fractals. Where did this idea come from?

Kellner: Fractals really are a new concept, and not just a new type of computer graphics. Benoit Mandelbrot, an IBM programmer, is credited with developing the first formulation of fractals into the language of mathematics. In 1977, he published his findings in a book entitled *Fractals: Form, Chance, and Dimension,* while lecturing on the subject at the College de France during 1973 and 1974.

Less than five years later, Loren Carpenter [of the Lucasfilm Computer Graphics Project, now known as Pixar] was experimenting with the basic principles of fractals. He believed that fractals could be used to generate 3D animation at a reasonable production cost. Late in the summer of '79, Loren found a way to make his idea work.

Carpenter is acknowledged to have

made the first successful translation of the principles of fractals into computer graphics for his short film "Vol Libre." "Vol Libre," meaning "Free Flight," ran approximately three minutes. One remarkable sequence of the film realistically simulated a small glider sailing through fractal mountains.

Jermaine: In simple terms, how do fractals work?

Kellner: Simply put, "fractal" means fractional dimension. Consider the following example: a straight line on a piece of paper. How many dimensions does it have? High school mathematics tells us a straight line is one-dimensional, but that's a theoretically perfect straight line, with no thickness whatever, extending to infinity in both directions. In the real world, there is no such thing as a theoretically perfect line. The line on the piece of paper is not perfectly straight, so it can't be one-dimensional. It doesn't curve around enough to completely fill up the paper, so it can't be two-dimensional either.

According to Mandelbrot, the line has a "dimensional number" somewhere between 1 and 2. Similarly, the paper it's drawn on has a "dimensional number" between 2 and 3. That's the basic concept of fractals. Every simple object in the real world can be described by a "dimensional number," which is a real number, not an integer (as we were taught in school). That particular line on the piece of paper has a very specific number that completely describes its "roughness." If you could calculate that number, you could reproduce the line exactly on a computer, with every bend and wiggle in its proper location.

Our software allows us to draw rough-looking fractal lines. Since these lines were formed using fractal theory, we can reproduce them exactly at any given size.

Jermaine: You use many elements in your programs that aren't found in most software. Where does this technology come from?

Kellner: All of the computer games produced by the Lucasfilm Games Division contain elements that were inspired by

Lucasfilm programmers Kevin Furry (l.), Charlie Kellner and Gary Winnick. (Not pictured: Chip Morningstar)

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the sound and visual effects generated for Lucasfilm movies. In addition, many of the basic principles of animation that are incorporated into our programs were pioneered by the Lucasfilm Computer Graphics Group, now known as Pixar. The prime concern of the Pixar group is to create images for film production, with each frame taking minutes or hours to create. We're producing real-time interactive games, which is a totally different way of looking at things.

Loren Carpenter took the principle of fractals, and made it work for us in a variety of ways. He designed our "fractal engine," which generated the background mountain graphics for the first Lucasfilm program called *Rescue on Fractalus*. Essentially, this 6502 graphic subroutine is a highly simplified version of the same fractal engine used to create the striking scenery of the "Genesis Effect" in *Star Trek II: The Wrath of Khan*. So to answer your question, our technology is developed by our own people, even though some inspirations come from outside the company.

Jermaine: What were the origins of *Rescue on Fractalus*, one of the first programs created by Lucasfilm Games?

Kellner: In 1982, David Fox came to Lucasfilm and shared an office with Loren Carpenter. He asked Loren if it was possible to make fractals work on the Atari microcomputer, and that was the beginning of *Rescue on Fractalus*. Loren started thinking of ways to implement fractals, while David began developing the ideas for the program, based upon what Loren thought might be possible.

Rescue on Fractalus is basically a search-and-rescue mission during an interplanetary war. Your assignment is to locate and rescue downed pilots on a mountainous world containing a cyanitric acid fog. To complicate matters, the same ray towers that shot down your people will fire at you whenever you're near their mountaintop positions. Of course you have your weapons, which makes things interesting. It's a good thing David came up with the idea of using fractals in *Rescue on Fractalus*. Without them you'd need a visual data base the size of a laser disk to generate the various landscapes found in the 100 levels of play. Even then, the point of view would not be as flexible, and the landscape couldn't be a tenth as varied as it is, although it still could be considerably more detailed.

Jermaine: Did you have any problems creating *Ballblazer?*

Kellner: To begin with, *Ballblazer* is a field sport, where the player grabs a ball and tries to fire it between two goal posts for points. In some respects the game resembles soccer, but it's a one-on-one confrontation, where both players drive vehicles.

Creating the split screen was the easiest part of the project. The checkerboard field wasn't very difficult to generate either. The data is present at all times, and it's just a matter of moving it around.

However, making the game work properly in real time, with the correct colors, presented many problems. The playing grid is actually antialiased. Even though you see two colors in the graphics, five colors are really being used to smooth the motion of the grid and take some of the jaggedness out of the grid lines. If you watch the grid lines as you move slowly across the field, something like 26 to 27 scan lines can be seen on the grid at one time. Actually, you're seeing a lot more detail than that. Each scan line contains five different levels of brightness, with a complex series of computations in the background, to make it work properly.

Jermaine: Charlie, you and Gary Winnick and Kevin Furry all worked on *The Eidolon*. Can each of you tell us a little about your backgrounds?

Kellner: I hardly did anything with computer games before I arrived at Lucasfilm in 1983. About seven years ago, during the early phase of my career, I did write several Apple computer games, but only one of them received any notice. It was a three-dimensional simulation of a bowling alley, which was fairly realistic.

Winnick: I'm the animator of the group. Until 1981, I was a commercial artist. This included a period of time in 1972 when I assisted Neal Adams, the DC comic/book illustrator, at his studio in New York.

After seven months, I returned to San Jose, California, and formed Horizon Zero Graphiques with my partner Frank Cirocco. We did freelance work until 1981, when I went to work as an animator for the Atari home computer division. After a year at Atari, I was offered a job with the new Lucasfilm Games Division. Some of my contributions here have been the Jaggi monster for *Rescue on Fractalus*, the Lucasfilm Games logo, the animation for *The Eidolon*, and some of the graphics for *Koronis Rift*.

Furry: I've been programming since I was seven years old. When I was about ten, I bought an Altair 8800 to build, which put me on the road to becoming a commercial programmer. After attending college to fill in the gaps of my education, I went out into the real world to program. During that period of my life, I worked on Mindset's graphics and video-producer packages and on two versions of Datasoft's *Nibbler*. I came to Lucasfilm Games in February of 1985.

Jermaine: *The Eidolon* is one of the newest program releases from Lucasfilm Games. How did this project begin?

> *"A particular line on a piece of paper has a very specific number that completely describes its 'roughness.' If you could calculate that number, you could reproduce the line exactly on a computer, with every bend and wiggle in its proper location."*

Kellner: The title of the program was a direct result of searching through Roget's Thesaurus for a name sounding typically 19th century, while describing the true principles of Dr. Agon's fantastic machine. "Eidolon" has three meanings: "An ideal figure," "A small winged figure, human or combining human with animal elements, found in Greek vase paintings," and the meaning we're concerned with, "An unsubstantial image."

The idea for *The Eidolon* started when we perfected a graphic mechanism for moving animated objects around on a microcomputer. We wanted to use this mechanism in a new game, so we developed a knights-and-dragons fantasy to support some graphics we had in mind. We thought we could create a type of Dungeons and Dragons® game, unlike anything presently on the market.

It took me several months to realize that this wasn't what we really wanted to do, so we scrapped the old design and created an entirely new fantasy from the ground up. Or, considering the fact that

> *"The title (of* The Eidolon*) was a direct result of searching through Roget's Thesaurus for a name sounding typically 19th century. . ."*

we were working with fractal caves, I suppose you could say we did it from the ground down. Anyway, we had done so many games taking place in the future, I was determined to point the theme of my program in a new direction.

The simulation of *The Eidolon* creates "an unsubstantial image" of a hidden world, which you can explore at your own leisure. As you become familiar with the caves of this alternate existence, you'll slowly begin to solve the secrets of the program. If you lose the game, your penalty (both in the real and fantasy sense) is to be returned to the real world.

Jermaine: What was your thinking as you developed the concept of the game?

Kellner: The working concept for the game was a simplified visualization of the inner workings of the human mind. This is suggested in Dr. Agon's diary, which appears in the game manual.

Winnick: Charlie wanted to create a Victorian flavor in the program. Even the machine was designed to have a 19th-century appearance.

Kellner: To understand the program, I should tell you the story of *The Eidolon*. Over 100 years ago, Dr. Josef Agon, an eccentric scientist and inventor, was known throughout the scientific community. He claimed his work dealt with the powers of the human mind, but some of his rivals accused him of experimenting with the occult. Before any of these claims could be substantiated, Dr. Agon vanished, and his relatives closed up the Victorian mansion where he lived and worked.

One day, your curiosity finally drives you to enter this forgotten dwelling, to see what's inside it. As you explore this dusty mansion, you discover a narrow stairway leading down to a glowing chamber. At the bottom of the stairs, you find a strange machine in front of a mirror, and a diary written by Dr. Agon himself. You read about the good doctor's exploits in an alternate dimension, and wonder what happened to him in that world after the last entry.

There's only one way to find out. It doesn't take much tinkering to activate the machine, and your quest begins. Your journey takes you through a land dominated by the forces of magic and strange powerful creatures. And what of Dr. Agon? Time flows differently in this dimension, so there's a distinct possibility he may show up somewhere in the game.

Jermaine: What can you tell us about the creatures of *The Eidolon?*

Winnick: It was my job to create the creatures for the program, since I'm the resident animator. The design ideas for these characters came from our group design meetings, as well as from my own imagination. Behavior patterns were contributed by almost every member of the Games Division. Of the eleven creatures and ten dragons I developed for *The Eidolon*, Charlie was able to incorporate all but two of each into the game.

Kellner: The programming for each creature is typically several thousand bytes of graphic data, combined with a unique "intelligence" module that ranges from a minimum of a few hundred bytes (for the Rotofly) to several thousand bytes for the Ultimate Dragon. Every one of these creatures and dragons also has at least one unique trait. Some are quite complex, particularly the Puffer Bird, the Polyps, and the Ultimate Dragon, found on the eighth level of the program. Several creatures present in *The Eidolon* actually contain more code than was found in entire video games of several years ago.

Jermaine: Why were fireballs incorporated into the game?

Furry: We decided early in the evolution of the program that it would contain dragons. Dragon fire is difficult to animate realistically, so we settled on the notion of the dragons spitting fireballs. For *The Eidolon*'s counter-weapon, we were looking for some sort of energy weapon which didn't look too futuristic. Dave Levine [another Lucasfilm programmer] came up with the idea of using a particle system to produce a vortex effect, displayed in the background of your battle with the Ultimate Dragon. We soon discovered that this effect could be animated very rapidly and inexpensively, so it was used for creating both the vortex and the fireballs.

Jermaine: How are the fractal landscapes generated?

Kellner: The landscapes in *Rescue on Fractalus, Koronis Rift,* and *The Eidolon* were constructed in real time from a very small "seed." With each of these games being based on fractal mathematics, the seed in each case represents the dimension number of the entire visual landscape. In *Rescue on Fractalus* and *The Eidolon*, the seed is 256 bytes, while the seed in *Koronis Rift* contains 640 bytes. With fractal graphics, this number represents the amount of information in the landscape regardless of the resolution. When you're dealing with conventional graphics, resolution and information content are one and the same.

Jermaine: Can you give us any additional technical insights into *The Eidolon?*

Kellner: To create the game, we programmed approximately 20,000 lines (about half a megabyte) of 6502 assembly code. It contains seven levels of fractal caves to explore, and a very special final level. The main program occupies exactly 24K of memory. One third of this code is associated with the fractal caves, one third animates the various creatures, while the remaining third is evenly distributed among sound and graphic effects. Maps, dragons, and creatures load in for each level, with each loading using all the available memory of the 64K machine. Creature files on the disk occupy another 64K of memory, with more than 100K being devoted to graphic animation. In short, *The Eidolon* was a very complicated venture.

Jermaine: As I wrap up part one of this interview, can you tell me anything about *Koronis Rift*, the subject of part two?

Kellner: Noah Falstein was programming *Koronis Rift* one day when he suddenly noticed his pocket calculator. He became interested in the way its numbers faded in and out. We decided to try to duplicate this effect, and discovered it wasn't as difficult as we'd originally thought. It was just a matter of coloring. In each successive frame, Noah colored the displayed letters with a slightly different color, to make them fade in and out. You can see the results of this idea on the status strip of *Koronis Rift*.

(Part 2 will appear in *Commodore Power/Play*, October/November.) ■

REVIEWED BY MATTHEW LEEDS

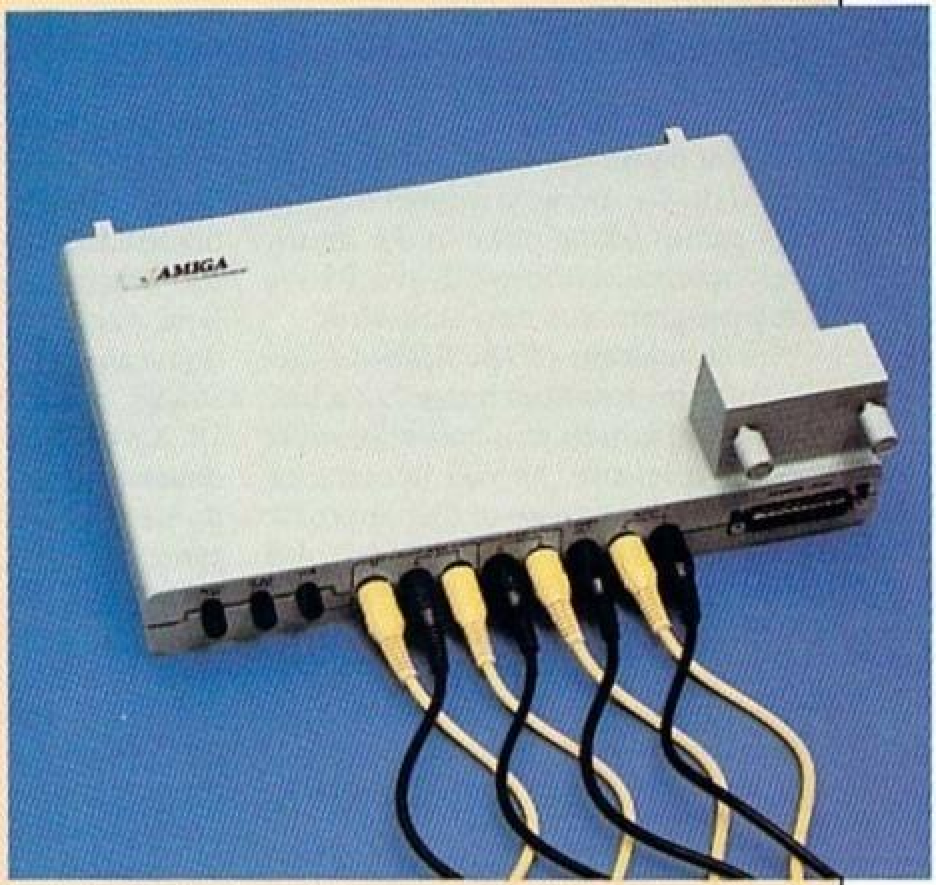
Amiga 1300 Genlock

Computer: Amiga
Manufacturer: Commodore
Business Machines
1200 Wilson Drive
West Chester, PA
19380
Price: $249.95

The Amiga personal computer has broken ground in just about every application it has been used for. It offers a tremendous amount of power for the price, often bringing applications that were out of reach of most users suddenly into a price range that is affordable. Sound, graphics, processor speed, and expandability all combine to open a new world of possibilities, and by adding peripherals to your Amiga, you can make the most of its potential.

One such peripheral, the Amiga 1300 Genlock, overlays the graphics and audio created on an Amiga onto a variety of video sources such as laser disks, video cameras, video tape, or other computers. This lets you add special effects to your video products in either composite or RGB format. Home movies, training tapes or video business presentations can be made more attractive by overlaying titles, captions and audio. Or you can link together a video camera with Amiga animations and descriptive text to produce an entertaining video. In addition, the 1300 Genlock gives you the ability to mix stereo Amiga audio with outside stereo sources for further unique results.

The 1300 Genlock lets you add special effects to your videos, overlay titles and captions, and mix Amiga audio with outside stereo sources.



How Video Works

To better explain how a genlock device works, I should start with some background on video in general. All consumer and most professional video display units use a cathode ray tube (CRT) and a system of generating an image known as raster scan. Let's start with a simple monochrome display. The inside front surface of the CRT is coated with a substance known as phosphor. At the back end, or neck, of the CRT is a device called an electron gun. The electron gun shoots electrons in a steady beam to the front of the CRT, and when they strike the phosphor coating, it glows for a fraction of a second.

To create a recognizable image, the electron gun must be under some kind of control. This control system is called raster scan. It works like this: The electron beam is first aimed at the top left corner of the CRT. It is then moved across the CRT in a straight line until it reaches the top right side. Then it is brought back to the left side (horizontal retrace) and moved down a miniscule amount, and another line is drawn. This is repeated very rapidly—at the rate of about 15,000 lines per second. When it reaches the bottom right corner, it is brought up to the left top again (vertical retrace), and the whole process is started over again.

After each line is drawn, the beam must be turned off while it is brought back to the left side, or it will draw over the existing image. It must also be turned off when it is brought up to the top of the CRT. To solve these problems, a portion of every video signal contains several reference signals. Two of these are horizontal blanking and vertical blanking. They tell the video signal when to turn the electron gun off during horizontal and vertical retrace of the electron beam.

There are other reference signals contained in video signals: reference subcarrier, black burst, color phase, horizontal and vertical phase, and alternate field offset. It's not important to know what all of these are, but you begin to get an idea of how complex a video signal is.

How Genlock Works

If you try to mix two video signals from different sources, the reference signals will not be coordinated. The electron gun will be confused as to which set of reference signals to obey, and possibly will not respond at all. A genlock device accepts an external video signal, strips the sync timing and color subcarrier signals from it, and uses these as reference values to control a computer's video signal. This, in effect, creates a new, single video signal.

The Amiga has the ability to display 32 colors in low-resolution mode. It keeps track of which colors to display by the use of color registers, numbered from 0 to 31. The 1300 Genlock accepts an external video signal, and displays it on the Amiga's screen wherever the color indicated by color register 0 is on the screen. If color register 0 is set to black, and the entire screen is black, then you would see only the external video signal. If you were using a paint program like *Graphicraft,* and had painted a picture of a television with its screen drawn in black, you would see the external video signal only in the black area of the television drawn on the screen. You are not limited to using black in color register 0. I've just picked it as an example. You may choose any of the 4,096 colors available on the Amiga.

According to Commodore-Amiga in Los Gatos, California, the 1300 Genlock connects directly to the bottom of the Amiga and draws all of its power from the Amiga. It accepts a composite (NTSC) video signal. There are three external controls: a horizontal position control to adjust where the incoming video image shows up on the screen in relation to the Amiga's image; a hue control to adjust the color of the incoming signal; and an audio-mix control. There is also a "pixel" switch.

The 1300 Genlock will output either a composite or RGB video signal. You can control the mix of the video output through the use of the "pixel" switch. This is a three-position switch that allows you to look at the Amiga's video only, the mix of the Amiga's and external video, or the external video only.

The 1300 Genlock also accepts two pairs of stereo audio inputs. Generally one of these would be from the Amiga, but you are not prevented from using other sources. These two audio signals are mixed and output as a single stereo audio source. The mix is controllable from the external audio mix port, or may be controlled by software.

A relay has been built in to pass external video through when the Amiga's power has been turned off. This allows you to keep your VCR or other video source connected through the Genlock, and still watch it on a monitor when you are not using the Genlock.

1300 Genlock Preliminary Specifications

Inputs
- Composite video, RS-170
- Stereo audio, line level
- Stereo Amiga computer audio
- Amiga computer RGB video

Outputs
- Composite video
- Stereo audio, line level, 600 ohm load
- RGB video, 1 volt into 75 ohm load (same pinouts as monitor connector)

Controls
- Hue for color correction of source video
- Horizontal Phase to position source video under Amiga computer graphics
- Audio Mix to adjust balance of Amiga computer audio to source
- Software control to turn off source audio
- Pixel switch

Power Requirements
- Power supplied by Amiga computer system

Weight
- 2 lb. 5 oz.

Dimensions
- 1.25" x 10" x 6.5" (HxWxD)

Color
- Standard Amiga light beige

Amiga MTV

The Amiga's combination of low cost and power has caught the interest of several independent video producers. For example, James Condit of Associated Computer Engineering in San Diego told me that his company provides video special effects for Steven J. Canneli Productions (A-Team, Riptide, Hardcastle & McCormick). They plan to use the Amiga whenever a computer is needed in the story line.

"The Genlock makes it much easier to film the computer's screen. Besides, the Amiga produces a much better display than any of the other computers we've used," Condit explained.

Dan Chase and Rob Terry of Vision Tech in Danville, California, have been using the Amiga and Genlock to produce MTV videos. They were working on a production for MTV's Basement Tapes with a band named A-HA when I spoke to them.

Dan Chase commented, "I'd always shied away from computers; they seemed too complicated, and I was afraid they would get in the way of the creative process. Once I saw the Amiga in use, how easy it was to control, and the great effects we could achieve using it, I was sold. We've been using it with the Genlock and LIVE! (video digitizer) to do things that would have cost us thousands of dollars more, and been a real pain to do with any other system. The closest we could have come to the effects we can get with the Amiga would have cost us five or ten times more with other equipment."

According to Rob Terry, "The important thing to recognize is what this means in terms of tools. You need tools to produce with, to create with. When you can't afford certain tools, it limits your potential. The Amiga, and the accessories, hardware and software that are available for it, bring a very powerful set of tools into the hands of people who never could have had access to them before. Video has become a strong medium for communication. Everyone has a VCR. Now everyone can create videos that have the sophistication to be recognized as a legitimate means of expression."

The 1300 Genlock is not limited to use in the production of music videos. Corporate communication departments, for example, will find it very useful in the production of industrial training and sales videos. More and more, companies are interested in creating these types of productions in-house as a cost-cutting measure. The high cost of training personnel in the use of complicated video equipment and the high cost of that equipment has prevented many companies from doing so, until now.

The 1300 Genlock will find a home in many different video applications. It adds great versatility to the Amiga, and does so at a price that is a fraction of what other devices currently available cost.

BY MATTHEW LEEDS

Amiga Expansion Chassis and More

Previews and rumors from the West Coast

The Amiga remains an exciting inspiration for new hardware and software developments. **Byte by Byte** of Austin, Texas, has taken an impressive leap into Amiga development with the announcement of the PAL, an expansion chassis that sits on top of the Amiga. It contains a hard disk drive with controller, 512K of RAM, battery-backed clock/calendar, a 200-watt power supply, and five DMA expansion slots.

The PAL expansion chassis prototype that I used contained a 50-megabyte hard disk drive. That's a lot of storage, but I think for many users it's a very reasonable starting point. According to Scott Peterson, President of Byte by Byte, the company will be offering a 20-megabyte version as well, for those who don't feel the need for as much storage. However, Peterson says many people request 40-megabyte drives, because the Amiga's sound and graphics can consume a lot of storage.

There is room in the PAL for additional hard drives, tape backups, and additional floppy drives. RAM cards in one-, two- and four-megabyte configurations will be available, as will prototyping boards, a pass-through buss connector, and a projected Ethernet option.

Also from Byte by Byte is *Info Minder*, an information indexing and retrieving software package. There are several modules to the system. The first is the access module, which lets you retrieve text and graphics from a variety of indexes, including tables of contents, lists of topics, nested outlines, or other types. When you point at the topic you are interested in and click the mouse, the information comes up on the screen. *Info Minder* uses IFF format graphics, and will wrap text around graphics to fit the screen layout.

> *Very few people have heard, yet, about the upcoming Amiga baseball game from Electronic Arts.*

The other modules in *Info Minder* are the information editor and compilers. You can create your own data bases of indexed information, and create indexes of any type you prefer. The author, Jim Becker, has produced several sample data bases that might be provided on the final release. One is an index of San Francisco area restaurants, and another is a discography of Grateful Dead songs.

The potential for *Info Minder* is tremendous. It runs blindingly fast, even from floppy disk. Becker thinks that information providers—encyclopedia publishers, medical data bases, law libraries—will use it as a front end to access their products. He also believes that it is a natural for use with CD ROM's. Having seen it in action, so do I. The program should be available by the time you read this column.

The new version of **Electronic Arts'** *Deluxe Paint,* presently in development, has many additional features. For starters, the program will now run from the Workbench and there is a toggle to change the resolution modes from within the program. You can also set the screen to either fill an 8-1/2 x 11-inch page or configure itself in the proper ratio for a television screen. When you toggle to a different resolution, the image in memory is converted to the new resolution mode. If you are using an image size that is larger than the screen can display, you can scroll the image to any section. There is also a "show page" option that displays the whole image at a scale that fits the screen. If you try to define an image size that requires more memory than you have, you will be told to select a smaller size.

The "fonts" menu has been changed to take advantage of any new fonts that you add to the system. You can now also use the "styles" option to create text that is underlined, boldface or italics. The "brush capture" now uses a polygon so that you can grab any shape as a brush. Ellipses can be rotated to create perspective.

The color palette control will have some new functions. For instance, you can swap the position of any two colors on the palette, which makes it easier to set up color cycles. You can also select colors to be "locked." Once they are set, you cannot draw on top of the selected colors until they are unlocked. There is also a smoothing command that softens the edges between two colors, and a stencil option that will let you do patterned fills. The load requester will have a DF1: button to select an external drive, and directory calls will be buffered in RAM, so when you call the directory a second time it's there at once.

Electronic Arts has changed their policy on copy protection for *Deluxe* products. From now on, all *Deluxe* programs will have a coupon included that will let the user purchase an unprotected backup disk for $20.00. This will allow users to install their programs on a hard disk without using the original as a key disk. All current registered owners of *Deluxe Paint* will be sent a coupon as well.

Very few people have heard, yet, about the upcoming *Mirage Baseball*, possibly to be named *Earl Weaver Baseball*, from Electronic Arts for the Amiga. It uses artificial intelligence to simulate Earl Weaver's strategy for managing a baseball team. The game combines strategy with arcade-style graphics, and makes use of the Amiga's excellent graphics and sound to create the most realistic simulation of the full baseball experience I've ever seen on a microcomputer. I'll just touch on some of the highlights I saw during a demo of an early version of the game.

There are three modes of play. The first is manager mode, in which the emphasis in on the strategy of the game; play selection, lineup composition, all the elements of a manager's decisions come into play. In action mode you can play an arcade-style game with a point of view above and behind home plate. Auto mode is where the computer plays itself and keeps track of the statistics—and there are a lot of statistics—every player's stats, game stats, team stats, everything is tracked and available.

All 26 major league ballparks in the U.S. are represented, or you can design your own. You can control the distance to the fences, the fence heights, the type of playing surface—everything. After you have described your personal playing field, the game creates it in full arcade graphics. There is a tremendous amount of detail imbedded in this game—the physics of baseball, the sounds of a ballgame—it's the nearest thing to being there. The programmers spent hours interviewing Earl Weaver to fully understand his personal strategy in managing a team, and that strategy has been incorporated into the artificial intelligence used by the computer. The scheduled release for this package is October. Look for it.

A quick note. The porting of Electronic Arts' *Marble Madness* to the C64 is moving quicker than planned. Look for an October release if events continue at this pace.

Brown Wagh has just released *Scribble!*, a word processor for the Amiga. I've been waiting for a product like this for quite a while. It uses all the features of the Amiga—menus, icons, mouse interface, scroll bars, size gadgets, and back-to-front gadgets. You can have up to four windows open, each with a different document, and cut and paste from one to another. Each window can have a different color, to make it easier to keep track of which one is which, as well as a different title bar. The program runs from the Workbench, and will multitask with other programs.

All the features you would expect to find in a word processor are available. Block moves are much easier with a mouse, as are marking text for boldface and underlining. *Scribble!* offers complete formatting control over headers, footers, indents, widow/orphan lines, page numbering and margins, and line spacing. You can preview the entire document onscreen, and there is a printer-setup capability for printers not supported by Preferences. Full on-screen help is available, as are character, word, and page counts. *Scribble!* will create ASCII files for telecommunications, and you can merge text from other applications into your document. In addition, the program is not copy protected, so you can install it on a hard disk. It's a well thought out, professional product.

> *From Accolade look for* Ace of Aces*, a docu-game for the C64.*

From **Accolade** look for *Ace of Aces*, a docu-game for the C64. This is a historical recreation of actual events during World War II. You are the pilot of a Mosquito airplane on a series of missions over Europe. For the Amiga, Accolade is working on *Mean 18*, a golf simulation on par in quality with their *Hardball* baseball simulation for the 64. It will contain four different courses, 72 different holes, and a Golf Course Architect Set that will let you design, play, and save your own courses. There are a variety of strategy and play options. The player has full control over the backswing, downswing, and follow-through. You also control the choice of club, shot direction, and swing force. Options include Tee, Green, and Hole practice sessions. Etiquette, rules, and the traditions of golf scoring must be maintained.

Activision is releasing *Murder on the Mississippi* for the C64. This a 19th-century murder mystery set on a Mississippi riverboat. The entire program is joystick driven.

Baudville is producing *Video Vegas* for the Amiga, a Las Vegas casino package that simulates the games found in the gambling establishments of Nevada. Blackjack, Draw Poker, Slots, and Keno are set with the same odds as in Las Vegas.

Microillusions has announced two products for the Amiga. *Discovery* is an educational program that mixes graphics, audio, and digitized speech to teach math and spelling skills to school-age children. *Dynamic CAD* is a conversion from a VME10 program. It includes support for the 68020 and 68881 chips, ASCII file storage for conversion to other CAD programs, isometrics, 2D drawings, symbol libraries, scaling, creation of database net lists, and IFF conversion. It supports a variety of printers and plotters not covered in Preferences.

Mindscape is releasing several games for the C64. Infiltrator is a helicopter simulation with a "Buckaroo Banzai" feel. *Spell of Destruction* is a graphic adventure in which you enter the Castle of Illusion, discover treasures, and cast magic spells. *Bop and Wrestle* is a professional wrestling 3D simulation with a comedy slant. It combines over twenty wrestling moves with graphics and music to portray the lighter side of the sport. *Fairlight* is a graphic adventure set in the land is Iswar. The magic has gone away, and it's up to you to bring it back. You must enter the castle and find the Book of Light, and restore the magic. A unique feature of *Fairlight* is that objects have their own mass and weight. When you lean on a chair, it moves.

Jasik Designs is working on *AmigaNosy*, a global interactive disassembler that enables developers to recover source code from the Amiga's ROM Kernal, and other system areas. Steve Jasik developed *MacNosy* as a tool for development on the Mac, and feels this product will be essential to developers on the Amiga.

Nolo Press has announced an upgrade to *WillWriter* for the C64. The new version includes enhancements to cover Testamentary Trusts and Forgiveness of Debts. *WillWriter* is a book/software package which allows you to create a will without a lawyer. Nolo Press is the leader in producing legal self-help books.

SSI Software will be converting *Word Perfect* to the Amiga. This word processing program has drawn kudos in the IBM world because it is both easy to use and powerful. It has a built-in thesaurus and spelling dictionary, split-screen viewing, and the ability to handle columnar layout. It also supports proportional spacing. Look for it around the end of the year.

That's it for this month. Stay tuned for next month's exciting new developments. ◼

BY ROBERT W. BAKER

Disk Master '86

for 1571, 1541, 1540, 4040 and 8050 disk drives

DiskMaster

Here's an updated version of my infamous Disk Master program, which lets you easily catalog over 100 disk directories onto a master directory on a single disk. The program automatically reads the directory blocks of a disk, and creates a condensed directory file on the master directory disk. It also maintains a cross-reference to track relationships between disk names and id's. In addition, Disk Master provides several functions for locating specific files, displaying individual directories, listing what disk id's are in use, and so on.

This latest version is almost a complete rewrite of the previous versions and now includes a few variables at the front of the program that allow customizing the program for using one or two disk drives as well as dual drive disks. The program runs on all Commodore systems except the VIC 20. On the Commodore 128, this version of Disk Master runs in C64 or C128 mode, because only BASIC 2.0 commands are used exclusively. The program will support just about any disk drive, including the 1571, 1541, 1540, 4040 and even the 8050. I couldn't make the changes for the 1001 drive because I don't have access to a drive for testing.

Setting Up For Your Drive

A few variables at the front of the program allow customizing the program for your particular disk configuration. These variables are grouped together at lines 220 to 270 in the program. The value of D1 (line 220) defines the device number, and the value of D1$ (line 230) defines the drive number of the disk drive that will be used for your master directory disk. The default values define drive 0 of device 8 as the drive to be used for your master directory disk, and should normally not need to be changed.

The values of D2 and D2$ (lines 240 to 250) then define the device and drive number of the disk drive that will be used to read the disks that are cataloged into the master directory. If you have only a single disk drive, such as a 1571 or 1541, then these values will be the same as those used for the master directory disk. With only one disk drive, you'll have to swap the master directory disk in and out between inserting disks to be cataloged. The default values of D2 and D2$ are set for a single disk drive.

If you have two single disk drives, then you can avoid swapping the master disk in and out by changing the value of D2. If one drive has been changed to respond to device number 9, then you can change the value of D2 to 9 and the program will use the two drives correctly. The device-8 drive will be your master disk while the device-9 drive will be used to catalog disks. The value of D2$ still remains a zero, since the disk controller for each drive recognizes only drive number zero.

If you have a dual drive like the Commodore 4040 or 8050, an MSD dual disk drive, or the equivalent, then you can change the value of D2$ to use the two drives within the same device 8 controller. In this case, simply change the value of D2$ to 1 to use drive one for cataloging disks and keep your master directory disk in drive zero.

If you are using an 8050 drive to read the disks that are being cataloged, you'll also have to change the value of BF in line 260 from 18 to 39. Do not change the value of BF for any other drive. This value identifies the track where the disk BAM and directory information starts, and must be correctly set to properly read the directory information from the disk.

Differences between 1541 and 1571 formatted disks are handled automatically by the program. Double-sided 1571 formatted disks can be cataloged on a single-sided 1541 drive, or on a 1571 drive operating in single-sided mode, without any problems. If you have a 1571 disk drive, the program leaves it in whatever mode it was found in when the program started.

If you like, you can actually change the values of the four variables D1, D1$, D2 and D2$ to suit your fancy. As long as the corresponding D1 and D2 values plus the corresponding D1$ and D2$ values are identical, the program will prompt for swapping disks whenever required. With any difference in the corresponding values, the program assumes the master directory disk is never removed and that a different disk drive is used for reading disks that are being cataloged.

Using the Program

To use the program, first format a blank disk to use as the master directory disk. The name and id you assign this disk can be anything you choose. Now copy the Disk Master program as the very first file on the disk, first being sure to have made any necessary changes to the variables defining your disk configuration. If you have only a single drive disk, also be sure you call the program "DISK MASTER" using all caps with a single space as shown. Line 2370 contains a dummy disk-copy command that is used to check that the master directory disk is inserted when required. The program checks for a copy of itself on the master disk, so the name of the program is important.

Once the program is saved on the newly formatted disk, load and run the program as usual. That's all there is to it. Disk Master will create and maintain all necessary files on the master directory disk, as long as you follow the program commands and always exit the program using the menu functions. Never press RUN/STOP while the program is running or the data files may be corrupted on the disk. If this should happen, you may have to start fresh with a blank disk and catalog your disks again.

For the program to function properly, the master diskette must always be placed in the drive when Disk Master is started. A prompt at the start of the program will remind you to insert the master disk before getting to the main function menu. If you are using a single disk drive, you'll be prompted when to insert the disk to be cataloged or reinsert the master disk.

I would strongly suggest that you do not put any other programs on the master disk, since the program assumes that the entire disk is available for storing directories. The program can catalog up to 141 disks on a 1571, 1541, and 4040 master disk or 221 disks on an 8050 master disk. However, to be safe, I would not try to catalog the maximum number of disks. Try to stop within five or ten of the maximum number, to prevent potential problems with disk space. You can create multiple master disks and divide your collection among the masters, if you have that many disks to catalog.

To use the program, choose the function you want from the main menu. (Entering 0 terminates the program and returns to BASIC with all files properly closed.) These five functions operate as follows.

[1] Update master directory

When this function is selected, insert the disk you want to catalog and press C to catalog that disk when you are prompted. If you are using two disk drives, the prompt will remind you where the disk to be cataloged goes. When asked to catalog a disk, the program will read the disk BAM and directory heading, then display the disk name and id to make sure the correct disk was inserted. If you enter N at this prompt, the program will prompt for another disk to be inserted and discard the information just read. After a Y response, the program will read the disk directory and sort the file names found into alphabetical order.

Disk Master lets you easily catalog over 100 disk directories onto a master directory on a single disk.

If the disk has already been cataloged with the identical disk name and id, a warning message will be displayed instead of the "correct disk" prompt. This message is meant as a reminder that the existing disk information in the master directory will be over-written with the new data if you proceed. If the wrong disk was inserted by mistake, an N response to the warning will abort the cataloging procedure. A Y response will allow cataloging of that disk, and the program will continue as usual.

If everything is ok, the program will then attempt to update the master disk directory with the newly cataloged disk information. If required, a prompt will ask for the master directory disk to be re-inserted. Disk Master will then update the master directory and a new copy of the cross-reference file will be written on the disk. Once this is completed, the prompt for inserting another disk to be cataloged will appear. At that point, the master disk or the last disk cataloged can be removed from the drive and the next disk inserted.

If any problem is detected while the program attempts to read the directory information from a disk, an error message indicates that an invalid directory format has been encountered. If the disk has more than the maximum number of directory entries or an invalid pointer to the next directory block, this error condition will occur, and the disk cannot be cataloged. Some protected disks, for example, have an invalid directory pointer with one directory block pointing to itself.

When you are finished cataloging disks, simple enter a Q when prompted for a disk to catalog. The program will terminate the update function and return to the main menu. If necessary, the program will remind you to re-insert the master directory disk before returning to the main menu.

[2] Delete disk entry from master

This function lets you remove a particular disk from the master directory. It performs all necessary housekeeping by deleting the appropriate data file and the disk entry in a cross-referenced list of disk names and id's. This should be the only method used to remove a data file from the master directory disk. Do not try to manually delete a data file.

The individual directory files are named DIR plus a special serial number assigned by Disk Master and maintained within the cross-reference file. The serial numbers are assigned sequentially as disks are cataloged, and numbers are later reused when disks are deleted.

To delete a disk directory, you must identify the disk by its disk name or id. A cross reference of disk names and id's is maintained so either can be specified. To enter the disk id instead of the disk name, press RETURN when you are prompted for the disk name, and then enter the disk id.

You can also use an asterisk at the end of the disk name to indicate character matching on the characters entered. The program will display a disk name and id, then check that the correct one is selected. If the response is N and an asterisk was used for character matching, the next entry in the cross-reference list will be displayed. This lets you quickly search for the desired disk if you can't remember the full disk name or the correct id. If you enter only an asterisk for the disk name, the program will automatically step through the entire list of disks until you indicate the correct one is found.

If a disk name or id is entered that does not exist in the master directory, an error message will be displayed. Simply press any key to continue and then enter another disk name or id. If no disks are currently cataloged, an error message will be displayed, and pressing any key will return you to the main menu. Pressing RETURN when you are prompted for the disk id will end the delete function and return to the main menu.

[3] Display selected directory

This function is used to display or print the directory of any disk that has been cataloged. The specific disk must be identified by its name or id. Once the correct directory is found, the program displays or prints:

(a) the disk name, id and format.
1541 and 4040 formats are indicated by a "2A" format.
1571 double-sided formats are shown as "2A-DS."
8050 formats are normally shown as "2C."

(b) the number of blocks free.

(c) the file name of each file on the disk, with the number of blocks in the file and the file type. Open and locked files will also be indicated.

(d) the total number of files on the disk.

While the directory is being displayed or printed, hitting any key will suspend the operation until another key is hit. If the next key is Q, the directory will be aborted and you can select another directory for display. Hitting the RETURN key for both the disk name and id will terminate the function and return to the main menu.

[4] List disk id's and names

Using this function, you can list the cataloged disks according to five different criteria. While any list is being displayed or printed, hitting any key will suspend the operation until another key is depressed. If the next key pressed is Q, the operation will be aborted, and control will return to the list-selection submenu. Entering zero for the list selection will return control to the main menu. The various lists provided are as follows.

List 1 produces a chart showing all disk id's currently cataloged. This is a two-screen display or about a full page of printout, and may take a little while to compile. It shows all id's consisting of the numbers 0 to 9 and the letters A to Z in any combination. It is intended to be used as a check sheet when assigning new disk id's.

List 2 displays an alphabetical list of all disk id's currently cataloged. Only the id's are given, along with the number of different id's used.

List 3 shows the disk id and disk name for each disk cataloged. The disks are listed in alphabetical order by disk id, and then by disk name for identical id's.

List 4 shows the number of free blocks on each disk along with the disk id and name. The program allows you to search for disks that have a minimum number of free blocks. For example, you can indicate that you want a list of all disks with at least 200 free blocks. The default value is zero, so every disk currently cataloged will be listed if you do not specify a different value.

List 5 is similar to list 4 above, except that it lets you specify a *maximum* number of free blocks. This allows you, for instance, to indicate that you want a list of all disks with no more than ten free blocks. An arbitrary default value has been preset at 99, so the program will automatically list all cataloged disks with less than 100 blocks free.

[5] Find specified file

This is probably the most handy feature of Disk Master, but can be rather slow with 1541 or 1571 drives when a large number of disks has been cataloged. This function lets you find all copies of a particular file and lists the disks they can be found on. Again, character matching can be used by adding a trailing asterisk to the file name, but at least one character must precede the asterisk. If an asterisk is not used, then the file name you enter must be exact.

Entering RETURN at the file name prompt will return the program to the main menu. While the list of files is being generated, pressing any key will suspend the operation until another key is depressed. If the next key pressed is Q, the function will be terminated and you can then enter another file to search for.

This function can be rather slow, as mentioned earlier, since each directory file must be opened and read record-by-record. Each directory is sorted in alphabetical order before being stored on the master directory disk. This is done specifically to help shorten search times, but sometimes has the side effect of distorting directories saved in a specific order. The search times are shortened by closing any directory file once a file name is reached that is beyond the desired search name, then opening the next directory file and searching again.

In Closing

In the past, various users have found that compiling their copy of Disk Master drastically improved the operating speed of the program. This version should be no different, and should compile without any problems. No fancy programming techniques or unusual commands have been used, so nothing should cause problems with whatever compiler you may happen to use. Also, BASIC 2.0 commands are used throughout, so the program will run on all machines with all versions of BASIC. Just keep in mind when compiling the program that a compiled version will run only on whatever system it is compiled for.

If you attempt to enter the program yourself from the magazine, watch your typing. Small mistakes are easy to make and extremely difficult to find, with potentially disastrous effects. When first using the program to catalog disks, experiment with work or scratch disks you can afford to lose if something is wrong in your copy of Disk Master. Use caution until you've proved the program is working 100%.

If you want to be safe, get a copy of the program on disk from Loadstar, the usual source for programs from this magazine. Eventually, it will also be available on QuantumLink for a copy you can directly download to disk. If you have any questions, problems, or suggestions, you can write or contact me through QuantumLink. ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Disk Master

```
210 CLR:GOSUB 1980:DIM D$(225),
    X$(225),U(225,2),B$(255)
    :FT$="SEQPGMUSRREL"'ERDL
220 D1=8     :REM - MASTER  DISK
    DEVICE#'CWFF
230 D1$="0" :REM - MASTER  DISK
    DRIVE#'CVGG
240 D2=8     :REM - CATALOG DISK
    DEVICE#'CXDH
250 D2$="0" :REM - CATALOG DISK
    DRIVE#'CWDI
260 BF=18    :REM - 39 FOR 8050
    DRIVES'CVII
270 :        :REM - 18 FOR ALL
    OTHERS'BRUI
280 Q$=CHR$(34): CLOSE 15
    : OPEN 15,D1,15: GOSUB 2360'FXIL
290 CX=2: GOSUB 1990: PRINT"READING
    DIRECTORY CROSS REFERENCE"'DJYS
300 CLOSE 5: OPEN 5,D1,5,D1$+"
    :DISK MSTR XREF,S,R"'DMEG
310 INPUT#15,EN,EM$,ET,ES
    : IF EN=62 THEN 340'EXUF
320 IF EN>0 THEN 2270'DHMC
330 INPUT#5,X$(NX),V:GOSUB 2260
    :U(NX,1)=V:U(V,2)=1:NX=NX+1
    :IF SS=0 THEN 330'JUFQ
340 CLOSE 5: CX=0: GOSUB 1980
    : PRINT"[DOWN,SPACE5]0 - DONE
    [DOWN]"'ELFI
350 PRINT"[SPACE5]1 - UPDATE MASTER
    DIRECTORY[DOWN]"'BAFK
360 PRINT"[SPACE5]2 - DELETE DISK
    ENTRY FROM MASTER[DOWN]"'BASM
370 PRINT"[SPACE5]3 - DISPLAY
    SELECTED DIRECTORY[DOWN]"'BAMN
380 PRINT"[SPACE5]4 - LIST DISK ID'S
    & NAMES[DOWN]"'BAJM
390 PRINT"[SPACE5]5 - FIND SPECIFIED
    FILE[DOWN]"'BAMN
400 GOSUB 1990: PRINT"ENTER DESIRED
    FUNCTION:[SPACE2]";'CGHH
410 GOSUB 1960: IF C$="0" THEN PRINT"
    [CLEAR]": GOTO 2330'GMCF
420 V=VAL(C$): ON V GOTO 430,960,1010,
    1140,1600: GOTO 410'FIMJ
430 CX=0: PRINT"[CLEAR,DOWN,SPACE6]
    INSERT DISK TO BE CATALOGED"
    : CLOSE 5: CLOSE 15'EJWO
440 IF(D1<>D2)OR(D1$<>D2$)THEN PRINT"
    [DOWN,SPACE7]IN DEVICE#";D2;"
    [SPACE2]DRIVE# ";D2$'IWYR
450 PRINT:GOSUB 1990:PRINT"[SPACE5]
    PRESS [RVS]C[RVOFF] TO CATALOG,
    [RVS]Q[RVOFF] TO QUIT"'DGBP
460 GET C$: IF C$="Q" THEN GOSUB 2340
    : GOTO 340'GNRK
470 IF C$<>"C" THEN 460'EFSI
480 GOSUB 1990:PRINT"OK,
     READING BAM ...":OPEN 15,D2,15,
    "I"+D2$:GOSUB 2260'FXWS
490 MD=0: OPEN 5,D2,5,"#0": GOSUB 2260
    : T=BF: S=0: GOSUB 2140'GDPR
500 MF=144: IF BF=18 THEN 560'ENKE
510 MF=224: DN$="": FOR Z=6 TO 21
    : DN$=DN$+B$(Z): NEXT Z'IDVL
520 S$=B$(24): IF B$(25)<>CHR$(0)
    THEN S$=S$+B$(25)'IDCL
530 DF$=B$(27)+B$(28):NB=0
    : GOSUB 2130'EYGJ
540 FOR Z=6 TO 251 STEP 5
    : IF Z<>196 THEN NB=NB+ASC(B$(Z))
    'LWYP
550 NEXT Z:GOSUB 2130:FOR Z=6 TO 136
    STEP 5:NB=NB+ASC(B$(Z)):NEXT Z
    :GOTO 600'LGGR
560 DF$=B$(165)+B$(166):NB=0
    :FOR Z=4 TO 140 STEP 4
    :IF Z<>72 THEN NB=NB+ASC(B$(Z))
    'OSOX
565 NEXT Z'BBTK
570 IF ASC(B$(3))=128 THEN FOR Z=221
    TO 255:NB=NB+ASC(B$(Z)):NEXT Z
    :DF$=DF$+"-DS"'NNRX
580 DN$="": FOR Z=144 TO 159
    : DN$=DN$+B$(Z): NEXT Z'HABR
590 S$=B$(162): IF B$(163)<>CHR$(0)
    THEN S$=S$+B$(163)'IGYT
600 DI$=LEFT$(S$+"[SPACE2]",2): U1=-1
    : U2=NX: IF NX=0 THEN 680'JABM
610 C$=DI$+DN$: FOR X=0 TO NX-1
    : IF C$<X$(X) THEN 670'JAPM
620 IF C$<>X$(X) THEN NEXT X
    : GOTO 680'GMRI
630 U1=X:X=NX:NEXT X:PRINT"[CLEAR,
    DOWN,RVS]*** WARNING ***[RVOFF,
    SPACE2]THIS DISK ID
    : [RVS]";DI$;"[RVOFF]"'EPUS
640 PRINT"[DOWN]DISK NAME: [RVS]";DN$
    : PRINT"[DOWN]IS ALL READY
    CATALOGED.[DOWN]": GOSUB 1990'DKBR
650 PRINT"[DOWN]CATALOGING THIS DISK"
    :PRINT"[DOWN]WILL DELETE THE
    PREVIOUS DATA![DOWN]"'CBXU
660 GOSUB 1990: PRINT"OK TO RECATALOG
    THIS DISK";: GOSUB 2020
    : GOTO 690'EPIS
670 U2=X:X=NX:NEXT X'DJRL
680 GOSUB 2000'BEDJ
690 IF C$="N" THEN 430'DFXM
700 GOSUB 1990: PRINT"READING
    DIRECTORY ENTRIES ...": NF=0'DJAM
710 T1=T: T=ASC(B$(0)): S1=S
    : S=ASC(B$(1)): IF T=0 THEN
    860'JGKP
720 IF T=T1 AND S=S1 THEN 820'FJRI
730 GOSUB 2140: FOR Z=2 TO 226 STEP 32
    : IF (ASC(B$(Z)) AND 7)=0 THEN
    800'KCVP
740 S$="": FOR X=3 TO 18
    : S$=S$+B$(Z+X): NEXT X
    : IF NF=0 THEN 770'LCNS
```

```
750 P=0: FOR X=1 TO NF: IF
    S$<MID$(D$(X),2,16) THEN P=X
    : X=NF'KDST
760 NEXT X: IF P>0 THEN 780'EHWL
770 P=NF+1: GOTO 790'DILL
780 FOR Y=NF TO P STEP -1
    : D$(Y+1)=D$(Y): NEXT Y'ITCS
790 D$(P)=B$(Z)+S$+B$(Z+28)+B$(Z+29)
    : NF=NF+1'IHWW
800 IF NF<=MF THEN NEXT Z
    : GOTO 710'GJTH
810 Z=226: NEXT Z'CGMF
820 PRINT"[CLEAR,DOWN,SPACE3,RVS]
    *** DISK DIRECTORY IS INVALID ***
    [RVOFF,DOWN]"'BARO
830 GOSUB 1990: PRINT"[DOWN3,SPACE3]
    CURRENT DISK CANNOT BE CATALOGED!
    [DOWN]"'CFAQ
840 PRINT"TOO MANY ENTRIES OR
    NON-STANDARD FORMAT[DOWN3]"'BALR
850 GOSUB 1940: GOTO 430'CIFJ
860 CLOSE 5: GOSUB 2340: GOSUB 1990
    : PRINT"UPDATING MASTER DIRECTORY
    ..."'EMDU
870 IF U1>-1 THEN X=U1: GOTO 920'GKAP
880 X=U2: IF X=NX THEN 900'EKTP
890 FOR Y=NX-1 TO X STEP -1
    : X$(Y+1)=X$(Y): U(Y+1,1)=U(Y,1)
    : NEXT Y'LJDB
900 FOR Y=0 TO NX+1: IF U(Y,
    2)=1 THEN NEXT Y'IODL
910 U(Y,2)=1: U(X,1)=Y: X$(X)=DI$+DN$
    : NX=NX+1: Y=NX: NEXT Y'IOVT
920 GOSUB 1840: PRINT#15,"S"+S$
    : OPEN 5,D1,5,S$+",S,W"
    : GOSUB 2260'GANP
930 PRINT#5,DF$;",";NB: GOSUB 2260
    : IF NF=0 THEN 950'FVJN
940 FOR X=1 TO NF: PRINT#5,D$(X)
    : GOSUB 2260: NEXT X'GTUO
950 CLOSE 5: CX=1: GOSUB 2180
    : GOTO 430'EOUN
960 PRINT"[CLEAR]TO DELETE DISK FROM
    MASTER DIRECTORY"'BAIU
970 GOSUB 1730: ON V GOTO 1000,
    960'DOQO
980 CX=1: PRINT#15,"S"+S$: Y=U(X,1)
    : U(Y,2)=0: FOR Y=X TO NX-1'JGEY
990 X$(Y)=X$(Y+1): U(Y,1)=U(Y+1,1)
    : NEXT Y: NX=NX-1: GOTO 960'IMBA
1000 GOSUB 2180: GOTO 340'CICU
1010 PRINT"[CLEAR]TO DISPLAY DISK
     DIRECTORY": GOSUB 1730
     : ON V GOTO 340,1010'EPCG
1020 GOSUB 2170: GOSUB 1880: NF=0
     : PRINT#4,"[SPACE2]DISK NAME
     :[SPACE2]";DN$'EUPE
1030 PRINT#4,"[SPACE4]DISK ID
     :[SPACE2]";DI$;SPC(8);"FORMAT
     :[SPACE2]";DF$'COIF
1040 PRINT#4,"BLOCKS FREE: ";NB'BFOC
1050 PRINT#4,"----------------------
     ---------------": IF SS>0 THEN
     1120'EKBJ
1060 GOSUB 2050: PRINT#4,RIGHT$("
     [SPACE4]"+STR$(X1+(256*X2)),4);"
     [SPACE2]";S$;"[SPACE3]";'HDCK
1070 V=(FT AND 7)*3-2: PRINT#4,
     MID$(FT$,V,3);'GVMI
1080 IF (FT AND 128)=0 THEN PRINT#4,"
     [SPACE2](OPEN)";'FLSI
1090 IF FT>=193 THEN PRINT#4,"[SPACE2]
     (LOCKED)";'FIXJ
1100 PRINT#4: GOSUB 1910
     : IF C$="Q" THEN 1130'FNYY
1110 NF=NF+1: IF SS=0 THEN 1060'FNLB
1120 PRINT#4: PRINT#4,"#FILES: ";NF
     : GOSUB 1930'DMMC
1130 CLOSE 4: CLOSE 5: GOTO 1010'DIDA
1140 IF NX=0 THEN GOSUB 1730
     : GOTO 340'FLHD
1150 GOSUB 1980: PRINT "[DOWN,SPACE5]
     0 - RETURN TO MAIN FUNCTION MENU
     [DOWN]"'CFJK
1160 PRINT"[SPACE5]1 - LIST FULL ID
     USEAGE CHART[DOWN]"'BAQI
1170 PRINT"[SPACE5]2 - QUICK LIST OF
     ID'S IN USE[DOWN]"'BATJ
1180 PRINT"[SPACE5]3 - LIST DISK ID'S
     & NAMES[DOWN]"'BAIJ
1190 PRINT"[SPACE5]4 - LIST [RVS]MIN
     [RVOFF] FREE BLOCKS PER DISK
     [DOWN]"'BAQN
1200 PRINT"[SPACE5]5 - LIST [RVS]MAX
     [RVOFF] FREE BLOCKS PER DISK
     [DOWN]"'BATF
1210 GOSUB 1990: PRINT"ENTER DESIRED
     FUNCTION:[SPACE2]";'CGHF
1220 GOSUB 1960: IF C$="0" THEN
     340'EKTB
1230 V=VAL(C$): IF V<1 OR V>5 THEN
     1220'HOTF
1240 PRINT C$: ON V GOTO 1250,1380,
     1450,1470,1500'DDXG
1250 GOSUB 1880: GOSUB 2400: Z=0
     : FOR X=48 TO 90: IF X=58 THEN
     X=65'KAVL
1260 IF PD=4 OR X<>73 THEN 1300'GKTH
1270 GOSUB 1990: PRINT"[SPACE2]
     PRESS ANY KEY TO CONTINUE, [RVS]
     Q[RVOFF] TO QUIT"'CFVO
1280 GOSUB 1960: IF C$="Q" THEN X=9999
     : NEXT X: GOTO 1150'HTQL
1290 PRINT"[CLEAR]";: GOSUB 2400'CGTG
1300 PRINT#4,CHR$(X);" ";
     : FOR Y=48 TO 90: IF Y=58 THEN
     Y=65'JUAG
1310 IF Z=NX THEN 1360'DHXA
1320 FOR V=1 TO 2: F$=MID$(X$(Z),V,1)
     : IF F$>="0" AND F$<="9" THEN
     1340'MBPL
1330 IF F$<"A" OR F$>"Z" THEN Z=Z+1
     : V=2: NEXT V: GOTO 1310'KRGK
1340 NEXT V: C$=CHR$(X)+CHR$(Y)
     : S$=LEFT$(X$(Z),2)'HWHJ
1350 IF S$=C$ THEN PRINT#4,"*";: Z=Z+1
```

```
     : GOTO 1370'HQPJ
1360 PRINT#4,".";'BDWD
1370 NEXT Y: PRINT#4: GOTO 1580'DING
1380 GOSUB 1880: PRINT#4,""SPC(7);
     "DISK ID'S CURRENTLY IN USE"'DKDO
1390 PRINT#4: V=12: IF PD=4 THEN
     V=25'GMWL
1400 Z=0: FOR X=0 TO NX-1
     : C$=LEFT$(X$(X),2)'HUTG
1410 IF X<NX-1 THEN IF
     C$=LEFT$(X$(X+1),2) THEN
     1430'JUWI
1420 PRINT#4,C$;" ";: Z=Z+1:'DLTD
1430 NEXT X: PRINT#4: IF
     Z<>INT(Z/V)*V THEN PRINT#4'KLIJ
1440 PRINT#4,Z;"ID'S,";NX;
     "DISKS CATALOGED":PRINT#4
     :GOSUB 1930:GOTO 1150'EUCN
1450 GOSUB 1880: GOSUB 2430'CJME
1460 FOR X=0 TO NX-1: PRINT#4,
     LEFT$(X$(X),2);"[SPACE2]";
     MID$(X$(X),3): GOTO 1580'IIXP
1470 GOSUB 1990: PRINT"ENTER MINIMUM
     NUMBER OF FREE BLOCKS"'CFAP
1480 INPUT"TO BE DISPLAYED[RIGHT3]0
     [LEFT3]";S$: VF=0: Y=0
     : IF S$="0" THEN 1530'GRGT
1490 GOTO 1520'BEFH
1500 GOSUB 1990: PRINT"ENTER MAXIMUM
     NUMBER OF FREE BLOCKS"'CFCJ
1510 INPUT"TO BE DISPLAYED[RIGHT3]99
     [LEFT4]";S$: VF=1'CHWJ
1520 Y=VAL(S$): IF Y=0 THEN 1150'FMGG
1530 GOSUB 1880: PRINT#4,"#BLKS FREE
     [SPACE2]";: GOSUB 2430'DNCI
1540 FOR X=0 TO NX-1: GOSUB 1830
     : GOSUB 2170: CLOSE 5'HRUK
1550 IF (VF=0) THEN IF (NB<=Y) THEN
     1580'HOJK
1560 IF (VF=1) THEN IF (NB>=Y) THEN
     1580'HOIL
1570 PRINT#4,RIGHT$("[SPACE7]
     "+STR$(NB),7);SPC(5);DI$;"
     [SPACE2]";DN$'FWIO
1580 GOSUB 1910: IF C$="Q" THEN X=9999
     : NEXT X: GOTO 1150'HTLO
1590 NEXT X: PRINT: GOSUB 1930
     : GOTO 1150'EMCL
1600 IF NX=0 THEN GOSUB 1730
     :GOTO 340'FLHE
1610 CLOSE 4:PRINT"[CLEAR]
     TO FIND WHAT DISK(S) A FILE IS
     ON[DOWN]"'CCQK
1620 INPUT"ENTER FILE NAME[RIGHT3].
     [LEFT3]";F$: IF F$="." THEN
     340'EJCL
1630 IF F$="*" THEN PRINT: PRINT"RE-";
     : GOTO 1620'GJOI
1640 S$=F$: GOSUB 1850: V=Y
     : GOSUB 1880'ERPJ
1650 PRINT#4,"...FILE NAME....[SPACE2]
     ";: GOSUB 2430'CIFK
1660 PRINT#4,S$: PRINT#4
     : FOR X=0 TO NX-1: GOSUB 1830
     : GOSUB 2170'IWEO
1670 GOSUB 2050: IF F$<LEFT$(S$,
     V) THEN 1710'FRIM
1680 IF F$=LEFT$(S$,V) THEN PRINT#4,
     S$;"[SPACE2]";DI$;"[SPACE2]";
     DN$'FWLP
1690 GOSUB 1910: IF C$="Q" THEN CLOSE
     5: X=NX: NEXT X: GOTO 1610'ITPR
1700 IF SS=0 THEN 1670'DHKD
1710 CLOSE 5: NEXT X: PRINT
     : GOSUB 1930: GOTO 1610'FOSG
1720 REM *****   SUBROUTINES
     *****'BVYH
1730 V=3:IF NX=0 THEN PRINT"[CLEAR,
     DOWN,RVS]NO ENTRIES";: V=1
     : GOTO 1820'HPEO
1740 INPUT"[DOWN]ENTER DISK NAME
     [RIGHT3].[LEFT3]";F$
     : IF F$="." THEN 1760'EKEP
1750 GOSUB 1850: Z=3: GOTO 1780'DMCJ
1760 INPUT"[DOWN]ENTER DISK ID[RIGHT3]
     .[LEFT3]";F$: IF F$="." THEN V=1
     : RETURN'GJLR
1770 F$=LEFT$(F$+"[SPACE2]",2): Y=2
     : Z=1'FOMN
1780 FOR X=0 TO NX-1: IF Y>0 THEN IF
     F$<>MID$(X$(X),Z,Y) THEN
     1800'MAEV
1790 GOSUB 1830: GOSUB 2000
     : IF C$="Y" THEN Z=X: X=NX
     : NEXT X: X=Z: RETURN'KYLV
1800 NEXT X'BBRB
1810 PRINT"[DOWN,RVS]NOT";: V=2'CETF
1820 PRINT" IN MASTER DIRECTORY!"
     : GOTO 1940'CFLK
1830 DN$=MID$(X$(X),3):
     DI$=LEFT$(X$(X),2)'EANM
1840 S$=D1$+":DIR"+STR$(U(X,1))
     : RETURN'FOGM
1850 F$=LEFT$(F$,16)'CJYJ
1860 IF RIGHT$(F$,1)="*" THEN
     Y=LEN(F$)-1: F$=LEFT$(F$,Y)
     : RETURN'KWWS
1870 Y=16: F$=LEFT$(F$+"[SHFT SPACE16]
     ",16): RETURN'FOUY
1880 GOSUB 1990: PRINT"WANT PRINTED
     COPY";:GOSUB 2020: GOSUB
     1990'EQIT
1890 PD=4: IF C$="N" THEN PD=3
     : PRINT"[CLEAR]";'GLER
1900 OPEN 4,PD: RETURN'CFPE
1910 GET C$: IF C$="" THEN RETURN'FFBH
1920 GOTO 1960'BENF
1930 IF PD=4 THEN RETURN'EDHI
1940 GOSUB 1990'BEUH
1950 PRINT"PRESS ANY KEY TO
     CONTINUE"'BAWO
1960 GET C$: IF C$="" THEN 1960'EJRM
1970 RETURN'BAQJ
1980 CLOSE 4: PRINT"[CLEAR,DOWN]";
     SPC(8);"[RVS] D I S K[SPACE3]
     M A S T E R [DOWN]"'DGPS
```

```
1990 PRINT"--------------------------
     -------------": RETURN'CBXT
2000 PRINT"[CLEAR,RVS]DISK NAME
     :[RVOFF,SPACE2]";DN$
     : PRINT"[DOWN,SPACE2,RVS]DISK ID
     :[RVOFF,SPACE2]";DI$'CJQE
2010 GOSUB 1990: PRINT"CORRECT DISK";
     'CGNA
2020 PRINT" (Y/N) ?[SPACE2]";'BBQX
2030 GOSUB 1960: IF C$<>"Y" AND
     C$<>"N" THEN 2030'INXF
2040 PRINT C$: RETURN'CDYY
2050 S$="": FOR Y=1 TO 20
     : GET#5,C$'FNKE
2060 SS=ST: INPUT#15,EN,EM$,ET,ES
     : IF EN>0 THEN 2270'FDWJ
2070 IF C$="" THEN C$=CHR$(0)'FHVF
2080 IF Y=1 THEN FT=ASC(C$)
     : NEXT Y'GKBI
2090 IF Y<18 THEN S$=S$+C$
     : NEXT Y'GLIJ
2100 IF Y=18 THEN X1=ASC(C$)'FJTA
2110 IF Y=19 THEN X2=ASC(C$)'FJVB
2120 NEXT Y: RETURN'CCMX
2130 T=ASC(B$(0)): S=ASC(B$(1))'ERPE
2140 PRINT#15,"U1:5,";D2$;T;S
     : GOSUB 2260'CQKE
2150 FOR X=0 TO 255: GET#5,B$(X)
     : IF B$(X)="" THEN
     B$(X)=CHR$(0)'JDIL
```

```
2160 NEXT X: RETURN'CCLC
2170 OPEN 5,D1,5,S$+",S,R": GOSUB 2260
     : INPUT#5,DF$,NB: GOTO 2260'FDCL
2180 IF CX=0 THEN RETURN'EDKG
2190 GOSUB 1990: PRINT"UPDATING
     DIRECTORY CROSS REFERENCE ...
     [DOWN]"'CFDQ
2200 PRINT#15,"S"+D1$+"
     :DIR XREF/TEMP"'DGYD
2210 IF NX=0 THEN PRINT#15,"S"+D1$+"
     :DISK MSTR XREF": RETURN'HKAI
2220 OPEN 5,D1,5,D1$+":DIR XREF/TEMP,
     S,W": GOSUB 2260'DPMH
2230 FOR X=0 TO NX-1: PRINT#5,Q$;
     X$(X);Q$;",";U(X,1): GOSUB 2260
     : NEXT X'HJJL
2240 CLOSE 5: PRINT#15,"S"+D1$+"
     :DISK MSTR XREF"'EIQI
2250 PRINT#15,"R"+D1$+"
     :DISK MSTR XREF="+D1$+"
     :DIR XREF/TEMP"'FJLO
2260 SS=ST: INPUT#15,EN,EM$,ET,ES
     : IF EN=0 THEN RETURN'GYML
2270 PRINT"[CLEAR,RVS]DISK ERROR
     [RVOFF]";: IF CX=0 THEN PRINT
     : GOTO 2310'GKUM
2280 IF CX=1 THEN PRINT" WHILE
     WRITING UPDATED"'EDUN
2290 IF CX=2 THEN PRINT" WHILE
     READING"'EDJM
2300 PRINT"[DOWN]DISK DIRECTORY CROSS
     REFERENCE FILE."'BATH
2310 PRINT"[DOWN]ERROR#
     :";EN;"[SPACE3]TRK/SEC
     :";ET;"/";ES: PRINT EM$'CPQH
2320 PRINT"[DOWN,RVS]PROGRAM
     ABORTED!"'BAKE
2330 CLOSE 4: CLOSE 5: CLOSE 15
     : END'EHUD
2340 CLOSE 15:OPEN 15,D1,15
     :IF (MD=1)OR(D1<>D2)OR(D1$<>D2$)
     THEN RETURN'MGFP
2350 PRINT"[CLEAR]";'BBDD
2360 MD=1: PRINT"INSERT MASTER DISK
     AND[DOWN]": GOSUB 1950
     : PRINT#15,"I"+D1$'FQPP
2370 GOSUB 2260: PRINT#15,"C"+D1$+"
     :DISK MASTER="+D1$+"
     :DISK MASTER"'GOGR
2380 INPUT#15,EN: IF EN=63 THEN
     RETURN'FKFK
2390 PRINT"[DOWN,RVS]INCORRECT DISK!
     [DOWN]": GOSUB 1990
     : GOTO 2360'DKXO
2400 PRINT#4,""SPC(10);
     "DISK ID USEAGE CHART": PRINT#4
     : PRINT#4,"[SPACE2]";'EMGI
2410 FOR V=48 TO 90: IF V=58 THEN
     V=65'HMKG
2420 PRINT#4,CHR$(V);: NEXT V: PRINT#4
     : RETURN'FLDF
2430 PRINT#4,"ID[SPACE2]
     ...DISK NAME....": PRINT#4
     : RETURN'DFGI
```

END

BEATLES
AC/DC
RUSH
ELVIS
BEATLES
LED ZEP
JOURNEY
DOORS
STONES
- -A-- -- ---- ---- -A--
ALICE YOUR UP
AE
TIME IS UP
CHRISTAL 15
ROGER 14
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PATTY 0
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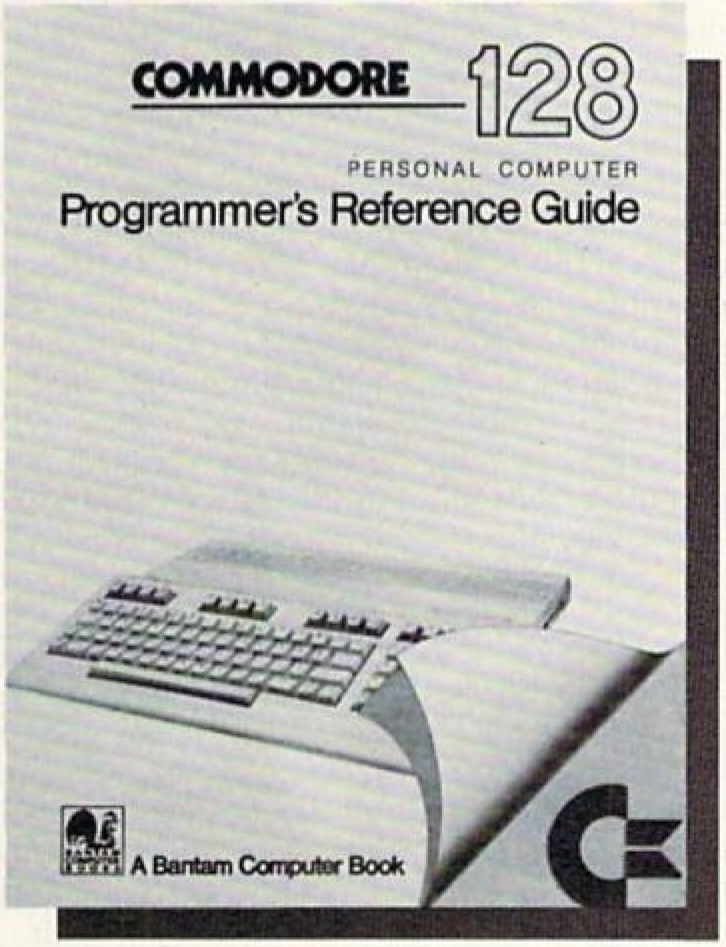

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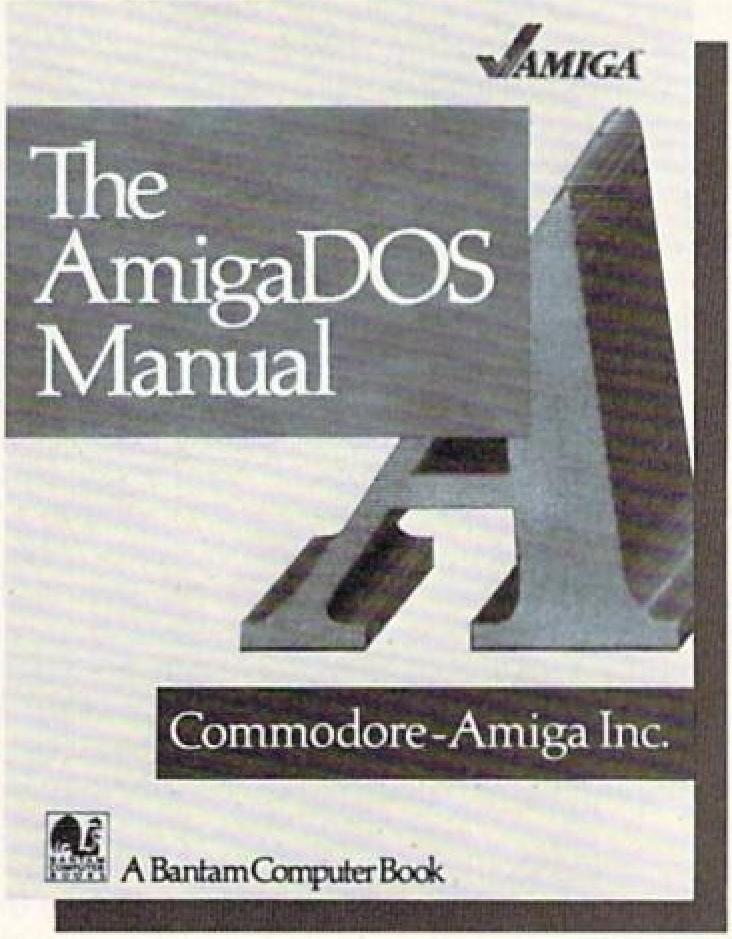

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BY MATTHEW OLDHAM

Strings Attached

for the Commodore 64

> *Concatenation is a useful way to save programming space and time when you have repetitive strings.*

Concatenating Strings

String concatenation is the programming technique that allows the programmer to combine two or more different strings into one (A$ = B$ + C$) or expand an existing string with another (A$ = A$ + B$). This technique is most useful and should be used on any data with a repetitive element or elements. An example of this are words themselves. Words are comprised of basically three parts: prefixes, suffixes, and roots, many of which are repetitive (in, re, ing, ed). The way these parts are put together can produce words of vastly different meaning (past, repast, pasted, repasted). At the end of this article, you will find the game program "Hangman II," which breaks words down into these parts, then reassembles them through the use of string concatenation. From 21 elements, I formed 42 words, and I doubt I found even a fourth of those possible. And, unlike most computerized hangman games, this one does not suffer from an easily discovered word list.

However, string concatenation is not limited to text. It may also be used with graphic symbols and even numbers in string format. For example, it is quite likely that the area code and the first three digits of your telephone number are the same as most others near you. So if, say, you had to process 100 of these numbers on your computer, the fastest and simplest way would be to concentrate your processing on only those elements that change from number to number. Compare the two program segments in Figure 1. The main difference between them is that, whereas in the second version the phone numbers are totally read from memory (NM$), in the concatenated version only the part that changes is read from memory (AD$) and is then combined with the part that stays the same (A$). You'll notice that not only does concatenation save space and time, it will continue to do even better with each new number processed. This is true for any other processing as well.

Any string expression can be concatenated, including graphic and graphic command strings. This can produce some very professional effects. One such is the program in Listing 1. This program creates a vertical bar graph for some quarterly sales figures (QT, rounded to the nearest million) using string concatenation.

Lines 100-110 set values for the variables involved. Lines 120-180 form each of the 20 horizontal lines necessary for the graph. Each line has a left border (lines 120-130) and a body consisting of either a bottom line (line 150), a block (line 140), or bottom-line spacing (line 160).

A block appears in the bar column only when the quarterly sales figure is greater than or equal to the current value of I. In other words, only when I has descended to the value of the QT in question (1-4), or less, will an inverted space appear in that particular column. Line 190 clears the screen and draws the graph. Lines 200-210 place the bottom border and information.

These are only a few of many possible uses of string concatenation. Soon, with just a little experience and experimentation, your own programs will come to make these examples, in comparison, seem quite basic.

Hangman II

In this game, you are in a cell locked with a word code. If you can break this code without making eight mistakes, you will escape. If you fail, you will have given your jailers time enough to construct a gallows—a gallows meant for you! When you run this program, a straight line will appear across the screen (line 280) with a smaller line just below that (line 270) and the prompt "WORD START" (line 290). At this time, the computer awaits a letter (A-Z). Play continues until the word is completed or, again, until eight mistakes are made. At your option, you will be recaptured and given new words until a gallows can be completed (lines 340-350) or until the word list is exhausted (line 370).

To concatenate the words in this program, we need to know several things. The first is the word parts list (BB$), from which we may pick and choose. Next we need to know the number of parts (NS) that we'll have to add for each word. And, finally, exactly which of these parts are to be added (WP). This information is obtained in lines 110-130.

Lines 230-240 or 370-390 produce a number from 1-42 (RN) that was not previously used. This is the number of the word to be formed and, knowing this, we are able to do just that in line 250. Remember: NS() gives us the number of additions to be made.

Figure 1. Concatenating Phone Numbers

CONCATENATED

```
100 A$-"(111)555-": DIM NM$(100)
110 FORI-1TO100: READAD$: NM$(I)=A$+AD$: NEXTI
120 DATA1111,2222,3333,4444,5555,6666,7777,8888,9999,0000,...
```

REGULAR

```
100 DIM NM$(100)
110 FORI-1TO100: READNM$(I): NEXTI
120 DATA(111)555-1111,(111)555-2222,(111)555-3333,(111)555-4444
130 DATA(111)555-5555,(111)555-6666,(111)555-7777,(111)555-8888
140 DATA(111)555-9999,(111)555-0000,...
```

WP(RN,J) is the subscript number of the part (1-21). BB$( ) is the part added and WD$ is the completed word. TL is the total number of letters in this word. This process will be repeated as the player wishes.

Lines 300-330 comprise the main loop, where the player's response is acquired. Lines 400-590 is where the response is acted upon. Lines 400-410 check the first letter of the word against the player's response. If they're the same and this letter has not previously been discovered (CK), then the player is given credit (FL). Lines 420-450 do the same for the mid portion of the word and lines 460-470 check the last letter. If a new discovery has been made, then there is a return to the main loop. If not, one of the eight things from 500-570 (gallows construction) will occur (on BW, line 495). The sound effect involves lines 160 and 580-590. Finally, lines 170-190 set the screen color, character color, and clear the screen, respectively.

Before typing these programs, read "How to Enter Programs," and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Listing 1. Sales Graph

```
90 DIM GL$(20)'BHOG
100 LN$=CHR$(164):GR$="[RVS] [RVOFF]"
    :FOR I=1 TO 5:SP$=SP$+LN$
    :NEXT I'JDFI
110 FOR I=1 TO 4:READ QT(I),NM$(I),
    PV(I):NEXT I'FYWE
120 FOR I=20 TO 1 STEP-1
    :IF I/5=INT(I/5)THEN
    GL$(I)=NM$(I/5):GOTO 140'OEVM
130 GL$(I)="[SPACE2,RVS,CMDR K,RVOFF,
    CMDR @2]"'BGLC
140 FOR J=1 TO 4:IF QT(J)>=I THEN
    GL$(I)=GL$(I)+GR$:GOTO 160'KERL
150 GL$(I)=GL$(I)+LN$'CPME
160 GL$(I)=GL$(I)+SP$'CPVF
170 NEXT J'BBDC
180 NEXT I'BBCD
190 PRINT"[CLEAR,DOWN2]";
    :FOR I=20 TO 1 STEP-1:PRINT GL$(I)
    :NEXT I'IQLN
200 FOR I=1907 TO 1932:POKE I,226
    :NEXT I:POKE 1906,124
    :POKE 1905,48'HJOH
210 FOR I=1 TO 4:POKE PV(I),I+48
    :NEXT I'GPME
220 GET NL$:IF NL$=""THEN 220'EKGC
225 END'BACD
230 DATA 17," 5[RVS,CMDR K,RVOFF,
    CMDR @2]",1949,7,"10[RVS,CMDR K,
    RVOFF,CMDR @2]"'BLGH
240 DATA 1955,14,"15[RVS,CMDR K,RVOFF,
    CMDR @2]",1961,11,"20[RVS,CMDR K,
    RVOFF,CMDR @2]",1967'BWMK
```

Hangman II

```
100 PRINT"[CLEAR,DOWN6]
    "TAB(16)"HANGMAN II"TAB(48)"BY
    MATTHEW OLDHAM"'DGHG
110 DIM BB$(21),NS(42),WP(42,6),
    WC(42),CK(20),AL(25),HN(11),
    LN(11),DR(11)'BPQK
120 FOR I=1 TO 21:READ BB$(I)
    :NEXT I'FNMC
130 FOR I=1 TO 42:READ NS(I)
    :FOR J=1 TO NS(I):READ WP(I,J)
    :NEXT J:NEXT I'KFCK
140 S=54272:POKE S+5,0:POKE S+6,240
    :POKE S+24,15'HASI
150 FOR I=0 TO 25:AL(I)=1230+I
    :NEXT I'GRKH
160 FOR I=1 TO 11:READ HN(I),LN(I),
    DR(I):NEXT I'FYAJ
170 POKE 53281,15'BISE
180 PRINT CHR$(31)'CEVF
190 PRINT CHR$(147)'CFBG
200 REM      MAIN LOOP'BIMX
210 PV=0:FL=0:BW=0:TL=0:WD$=""'FTGF
220 IF AC>37 THEN GOSUB 370
    :GOTO 250'FLGD
230 RN=INT(RND(1)*42+1)'FKEE
240 IF WC(RN)<>0 THEN 230'EKEE
250 AC=AC+1:FOR J=1 TO NS(RN)
    :WD$=WD$+BB$(WP(RN,J)):NEXT J
    :TL=LEN(WD$)'KTAS
260 WC(RN)=1:FOR J=1 TO TL:CK(J)=0
    :NEXT J'GVDK
270 PS=1884-INT(TL/2):FOR J=0 TO TL-1
    :POKE PS+J,45:NEXT J'LBYQ
280 FOR J=0 TO 39:POKE 1784+J,111
    :NEXT J'GQBL
290 PRINT"[HOME,DOWN2,SPACE5]WORD
    [SPACE2]";AC;"[SPACE2]START"'BELK
300 GET LT$:IF LT$=""THEN 300'EKRB
310 PV=ASC(LT$):IF PV<65 OR PV>90
    THEN 300'HTBH
320 GOTO 400'BDDA
330 GOTO 300'BDCB
340 PRINT"[HOME,DOWN5,SPACE5]
    CONGRATULATIONS! YOU ESCAPED!!"
    :FOR J=1 TO 1500:NEXT J'FJKP
350 INPUT"[SPACE5]DO YOU WANT TO TRY
    (A)GAIN";AN$:IF AN$="A"THEN
    190'ELUO
360 END'BACD
370 IF AC=42 THEN PRINT"[CLEAR,DOWN4,
    SPACE5]SORRY, WE'RE ALL OUT OF
    WORDS":GOTO 360'FINS
380 FOR J=1 TO 42:IF WC(J)=O THEN RN=J
    :RETURN'IPON
390 NEXT J:RETURN'CCWH
400 L$=LEFT$(WD$,1)'CJLB
410 IF ASC(L$)=PV AND CK(1)=0 THEN
    CK(1)=1:FL=1:POKE PS,PV-64'KFYM
420 FOR J=2 TO TL-1'EFGD
430 M$=MID$(WD$,J,1)'CLHE
440 IF ASC(M$)=PV AND CK(J)=0 THEN
    CK(J)=1:FL=1:POKE PS+J-1,
    PV-64'MHCR
450 NEXT J'BBDD
460 R$=RIGHT$(WD$,1)'CJSH
470 IF ASC(R$)=PV AND CK(TL)=0 THEN
```

Continued on pg. 175

BY IAN ADAM

Cursor Byter

for the Commodore 64 and VIC 20

Here's a handy little routine that's so simple, yet so useful, that you'll wonder how you ever programmed without it. This easy-to-use command will give you total control over the position of the cursor on the screen of the Commodore 64 or VIC 20. Simply invoke the command, and the cursor is instantly moved to the location you specify, regardless of its present location or any other material on the screen.

The command is easy to use, operating just like any normal BASIC command. SYS CRSR, row#, column# is all that it takes. You have complete and precise control, unlike other methods which expect you to keep track of the current position of the cursor or worry about screen layout. And although the routine takes advantage of a little machine language, you don't need to learn about machine language to use it, or worry about memory allocation. That's because the routine is contained within a REM statement in the first line of your program.

Background

Often, formatting the screen involves little more than printing a series of messages. However, in many cases it can be much more complicated, often requiring repositioning the cursor to different areas of the screen several times. This may be necessary in order to convey complex messages, get input, and so on. In many games, the cursor is used to animate figures or objects, and must be under complete control.

Unfortunately Commodore BASIC does not always make positioning the cursor easy. To partially compensate, Commodore does provide some very useful commands. Printing the cursor control characters, for example, allows you to move the cursor one space at a time in any direction. You can also HOME to the upper left corner of the screen. And the TAB and SPC functions allow easy horizontal positioning, within certain limitations.

Simply invoke this little routine and the cursor moves instantly to the location you specify.

There are some drawbacks in this process, however. All of these commands assume that you have a pretty good idea of where the cursor is presently located. In addition, using the cursor control characters can get pretty cumbersome sometimes, particularly if you want to move a long way.

Perhaps one of the worst problems is the line links. Under some circumstances, a pair of lines will be treated as if they are linked to form one long 80-character line on the 64. On the VIC, up to four lines can be linked together. When this happens, the TAB function doesn't work the usual way, and printing a RETURN may cause the cursor to jump down two to four lines instead of one! That cursed cursor!

Many programmers will respond to this challenge by developing an ingenious system to position the cursor at a desired location. However, most are very cumbersome to use. In spite of their ingenuity, most systems I have seen just don't work well.

The method described here overcomes these problems. A simple SYS statement immediately places the cursor at the specified coordinates. It uses a very small machine-language routine to move the cursor, calling upon a couple of the standard kernal procedures already built into the computer. Use of the kernal routine to move the cursor, known as PLOT, has been documented before, but never has it been made this convenient!

How to Enter it

As I mentioned, you don't have to worry about all of the details in order to take advantage of this program. Just follow these three simple steps:

1. Type in the program for your computer, shown in Listing 1, *exactly* as shown. Two things are critical: First, line 0 *must* be the first line in your program. Second, it must be typed exactly as it's shown.
2. Save the program to disk or tape *before* you run it. This will protect against any fatal typing error that is always a possibility with a machine-language program. This program should become part of your library of standard routines, so put it in a safe place.
3. After saving it, run the program. If you get a checksum error or OUT OF DATA error, check over the data statements in lines 8 and 9 carefully, then run again.

The program is now ready to use.

Using the Command

After running, give it a try. On a Commodore 64, enter:

SYS 2054,5,10: PRINT"CURSOR HERE"

On the VIC 20, replace the 2054 with the number given by the program, which will vary depending on the amount of memory in your VIC.

If you now list the program, you will see that it has changed. The REM in line 0 has sprouted a series of odd commands and graphics characters in place of the alphabet it previously held. This is because line 5 has poked the machine code into that space. The new characters represent the screen editor's attempt to interpret the code. If you wish, you may now delete lines 4 to 9 from the program. It will work without them, and can be included at the beginning of other programs you write.

Here are some important points to note:

- The row and column may be expressed as numbers, variables, or any suitable expression.
- The top row and left column are numbered at zero.
- The bottom row and the last column are 24 and 39 on the 64, 22 and 21 respectively on the VIC. Larger values should not be specified.
- A row value must be given, or you will get an error.
- The column value may be deleted if it is zero.

Listing 2 provides a short demonstration of how to position the cursor. Starting with Listing 1, type in lines 10 through 230. You may save this if you wish, but it isn't mandatory.

Byte That Cursor!

Don't curse the cursor—byte it instead! Please feel free to incorporate the Cursor Byter routine in other programs you write. It doesn't take up much room, and it should make your programming task much simpler. By using it, you will find it easier to format screens. The natural result will be that you have improved communication with the user—all of which helps to make your computer that much more personal! ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694. Do not use the Magazine Entry Program with VIC Programs.

Listing 1. C64 Version

```
0 REM ABCDEFGHIJKLMNOPQRSTUVWXYZ'BBJG
3 REM SYS 2054, ROW, COLUMN TO
  USE'BXHI
4 FOR I = 2054 TO 2078'DJMF
5 READ A: POKE I, A: T = T + A'EJFH
6 NEXT'BAEE
7 IF T - 3351 THEN PRINT"CHECKSUM
  ERROR": STOP'FGFN
8 DATA 32,241,183,138,72,160,1,136,
  177,122,201,44,208'BVPP
9 DATA 5,32,241,183,138,168,104,170,
  24,76,240,255'BRKP
```

END

Listing 1. VIC Version

```
0 REM ABCDEFGHIJKLMNOPQRSTUVWXYZ
3 CRSR = PEEK(43)+256*PEEK(44)+5
  :PRINT"SYS"CRSR ",ROW,COLUMN TO USE
4 FOR I = CRSR TO CRSR + 25
5 READ A: POKE I, A: T = T + A
6 NEXT
7 IF T - 3445 THEN PRINT"CHECKSUM
  ERROR": STOP
8 DATA 32,241,215,138,72,160,1,136,
  177,122,201,44,208
9 DATA 5,32,241,215,138,168,104,170,
  24,76,240,255,30
```

END

Listing 2. C64 Version

```
0 REM ABCDEFGHIJKLMNOPQRSTUVWXYZ'BBJG
3 REM SYS 2054, ROW, COLUMN TO
  USE'BXHI
4 FOR I = 2054 TO 2078'DJMF
5 READ A: POKE I, A: T = T + A'EJFH
6 NEXT'BAEE
7 IF T - 3351 THEN PRINT"CHECKSUM
  ERROR": STOP'FGFN
8 DATA 32,241,183,138,72,160,1,136,
  177,122,201,44,208'BVPP
9 DATA 5,32,241,183,138,168,104,170,
  24,76,240,255'BRKP
10 POKE 53281,0: CRSR = 2054
   : PRINT CHR$(147)'EWJE
20 SYS CRSR,4,12: PRINT CHR$(5)"GOOD
   AFTERNOON"'DNHG
30 GOSUB 200: SYS CRSR,19,6
   : PRINT CHR$(156)"YOU HAVE
   CONTROL!"'ETVK
40 GOSUB 200: SYS CRSR,8
   : PRINT CHR$(159)"MESSAGES CAN
   APPEAR..."'EQXL
50 GOSUB 200: SYS CRSR,12,20
   : PRINT CHR$(31)"ANYWHERE YOU
```

Continued on pg. 174

64 USERS ONLY

BY MARK JORDAN

Muzic Maker

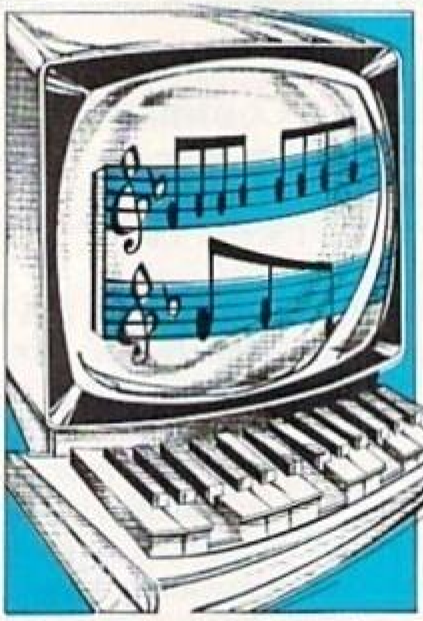
for the Commodore 64

Incorporating music into games and other programs is fairly easy for the intermediate programmer as long as the action stops for the musical interlude. What gets hairy is achieving "transparent" music—tunes that play while the action continues. While this really dresses up a game, it is unfortunately beyond the range of many hackers.

"Muzic Maker" will, with the aid of the hardware interrupt, do it for you. Not only that, this program will simplify the entire music-producing process and make transposing sheet music into computer music a breeze. In other words, you can use Muzic Maker as a utility to add music to your programs or you can use it as an end in itself just to record music.

Here are some of the features of Muzic Maker. Sheet music can easily be transposed into three-part harmony. Aural and visual note verification is used. Input errors are easily corrected in several ways. Musical parameters such as waveform and attack/decay/sustain/release (ADSR) can be conveniently altered *while the song plays*. Each voice can have different parameters and different note durations. Songs can be chained, allowing the program to pick the appropriate tune at the appropriate time. Songs can be worked on in sections. Finally, songs are easily saved and reloaded from within Muzic Maker.

Muzic Maker has the ability to hide in the background which, in this case, means memory locations 49152 to 51968. In this sense, it is like Muzak™, the piped-in background music you semi-hear in grocery stores and shopping malls. While I'm not overly thrilled about the existence of this art-form, the concept certainly fits this program. Muzic Maker is completely transparent—once your song is composed, you can do your thing without worrying about it.



With Muzic Maker, you can easily have music playing in the background of your programs. Or use it to simply transpose sheet music into computer music.

As mentioned, the secret of this program is its use of the hardware interrupt. Sixty times a second the Commodore 64 stops executing your program and does some important stuff like check the keyboard, etc. Muzic Maker causes the interrupt to also play your notes and keep track of how long they've been on (and off). The interrupt, as you can see, has dual value for a music generator: It not only affords reliable timing, but it also works independently of and concurrently with whatever program is being executed.

The hardest part about using Muzic Maker is typing it in. In designing this program for magazine publication, I was forced to keep it as lean as possible. (Who wants to type in a 12K listing?) Feel free to loosen it up, change the default settings, or whatever, to personalize it. The program is semi-structured. That means you can easily alter an existing subroutine or add an entirely new one. I eliminated all the original REM statements to save typing, but program logic is included with this article. Remember to save it before running it the first time, in case you crash it.

Learning to use Muzic Maker is much simpler than most music programs. Screen prompts are used extensively to guide you along. I've tried to user-proof each INPUT and GET statement to prevent those horrible division-by-zero errors and so forth. And about those GETs and INPUTs: Remember, if you see a questionmark preceding the flashing cursor, it's an INPUT statement. You must terminate your response with RETURN. Otherwise, a single keypress is all that's required. You may prefer to change all the INPUTs to single-keypress GETs. I chose to go with INPUTs to allow the user to double-check before entering.

How to Use Muzic Maker

User input in this program comes in three stages: 1) initialization, 2) note designation, and 3) parameters designation. Initialization determines tempo, voices, etc. Note designation determines each note's duration, octave, and name. The parameters section allows the user to change the envelope (attack, decay, sustain and release) as well as waveform (sawtooth, triangle, pulse or noise) while listening to the song.

The initialization stage requires four responses. The first is whether to append or not. You'll choose this option if you have a song loaded prior to running Muzic Maker and you wish to add to it. This way, if you don't finish an entire song in one sitting, you can save it, and when you're ready to finish it, load the unfinished song first, then load and run Muzic Maker and type the asterisk (*) when the prompt comes up. You can also use this feature to string songs together. Muzic Maker is limited to 255 successive notes. But, since the average song runs about 40 to 100 notes, you could have several of them back to back.

Next you must designate whether you want to program in sharps or flats. Type a plus sign (+) for sharps, a minus (−) for flats. Naturally, the key the song is in will determine whether sharps or flats are in order. If the song you are working on isn't either (in other words, it's in the key of C), you still must choose one.

The importance of this surfaces when you encounter accidentals, those sharps or flats that aren't included in the song's key. If you've opted for flats, you must type your accidentals as flats. Thus, an accidental written as D-sharp would need to be typed as E-flat. If you have no idea what accidentals are, don't worry about them. You'll learn all about them the first time you encounter one while transposing sheet music for Muzic Maker.

Your third initialization decision is the number of voices you want to program with. With the Commodore 64, the maximum is three. The only good reason for choosing fewer than three is that you only want a simple tune and you don't want to mess with three-part harmony. I choose three as a matter of course, and made the default setting for the program three.

Finally, you must decide what tempo you wish the song to play in (fast, medium or slow). Choose the default setting—medium—until you get a feel for the differing play speeds.

Now comes the serious business of note input. Starting with voice one, you must, note by note, enter your tune. You can use voice one as the bass, tenor, or whatever (I always make voice one the melody, which is the topmost note on the staff). You continue to enter voice-one data until you tell the computer that you're ready to exit voice one and enter voice-two input. Pressing an asterisk (*) following any note will automatically do this for you.

The note-designation stage begins by showing you a staff with a big fat note sitting at middle C. This note will, after you've defined its duration, octave, and name, jump to the proper position on the staff. The purpose of this is to allow visual verification of your input. Accompanying this is the sound of the note for aural verification as well.

First, you must establish the duration of each note. The number 1 equals a whole note, a 2 equals a half note, a 4 equals a quarter note, etc. What about dotted notes, you ask. Simply precede your duration number with a period. That is, a dotted quarter note would be input as .4 (period-four). You can use durations as fast as 16ths. (Or, you can set the tempo to fast, double all durations, and use 16 to set 32 notes.)

After you've given the note you're working on its duration, you need to give it an octave. This is—until you've done it a couple of times—the trickiest part of Muzic Maker. Middle C is the beginning of the fourth octave. Keep that in mind. As your notes ascend the scale, each C begins a new octave. Therefore, much of the treble staff is in the fourth octave while much of the bass staff belongs to the third octave. The visual and aural cues at the end of your input will help you immediately discover if you've chosen the correct octave. If you're a touch typist and have an ear for music, the aural cue is often all you'll need.

> *Musical parameters can be conveniently altered* while the song plays. *Songs can be chained, allowing the program to pick the appropriate tune at the appropriate time.*

To complete the note-designation stage, you must name the note. Naturally, there are but seven choices, A, B, C, D, E, F or G. Ah, seven plus five—the sharps or flats. To type these in, obey the screen prompt and type a minus sign (−) for flats or a plus sign (+) for sharps. Therefore, a C-sharp is entered as C+. Make that seven plus five plus one more "note," the rest. Type an English pound sign (£) for each rest you need.

It is at this point that the fat note on the staff jumps to where you've programmed it and the sound of it begins. If all looks and sounds okay, hit RETURN. If not, press the back arrow to redo the note. The only other option available at this point is the asterisk (*) which, as mentioned, signals that you wish to exit this voice.

Let me give you a tip in entering sheet music. Don't type in an entire voice before exiting to the next voice. Instead, type in a line or less, exit to the next voice, type the same number of measures for it, then exit and repeat for voice three. Now you can play your tune and edit any errors. Believe me, it's far easier to correct errors (and they're usually timing errors which really make the song go haywire) in small doses than to complete the whole song first and then try to make corrections.

After you've designated each note in each voice, you're ready to set the musical parameters for each voice. What's that? You say you knew it was coming—this thing is getting technical. No, no, no. This is the fun part. With the screen as your guide, you can, while the song plays, change the attack, decay, sustain and release (the envelope) without having the slightest inkling of what's going on, technically.

I believe you'll find this a superior method of envelope definition compared to those in which you set these parameters isolated from the tune. With Muzic Maker operating from an interrupt, you are able to immediately hear the effects of changes in not only envelope but also waveform. You'll quickly learn how to get the effects you want. For instance, to get a plucking sound, attack must be low, sustain low, and decay and release medium.

All this can be accomplished while the song plays. When you first get the parameters screen, you must press a function key to start voice one. You'll see six ranges listed for the envelope at the bottom left of screen. Most likely they'll all be 15's, which are too high. Press the A, D, S, R, P, or H keys to increment attack, decay, sustain, release, low pulse and high pulse. Each value rolls over at 15 so you'll be back to zero. Tap the keys until you get the sound you like.

The up-arrow key allows you to work with the next voice. Press it, followed by a function key, to set the waveform of the next voice. This will put you in voice two. Do the same as above for its envelope. Repeat for voice three.

As you fiddle with your creation, you may notice an errant note or many errant notes. Type a back arrow to review each note in any given voice. Another way to edit is to press a 1, 2 or 3 to stop that respective voice at the note that is currently playing at that point. You'll be able to edit it without tracing through the entire voice. Just follow the prompts to make changes.

Program Explanation

Line	Purpose
10-75:	Initialization of variables
80-125:	Main program loop
130:	Clear SID
135-145:	Establish song's boundaries
150-300:	Parameter input
305-315:	Number of voices
320-495:	Note input
500-510:	Sound single note
515-635:	Edit notes
640-730:	Print parameter screen
735-780:	Convert notes to frequencies
785-815:	Poke note's duration and frequency into memory
820-850:	Choose sharps or flats
855:	Input routine
860-875:	Set up note sprite and great staff
880-895:	Song save routine
900-915:	Appendage option
920-935:	Section song
940-945:	Note name data
950-960:	Sprite data
965-1160:	Machine-language data

Important Machine Language Locations

49408-49410:	These hold the beginning note locations for voices 1 through 3
49414-49416:	These hold the waveform types for voices 1 through 3
49417-49419:	These hold the ending note values for voices 1 through 3
49433:	This will push a new starting value into locations 49408 through 49410
49421-49432:	These registers determine the envelope and pulse values for all three voices. Poking directly to the SID locations will not have a lasting effect as the interrupt will re-determine them every sixtieth of a second.

If you are just testing a section out, type a plus sign (+) when you're ready to add to your segment.

If you wish to shut off a voice (or two) so you can listen to just one, press zero (0) for each voice you want to shut off. Don't forget to press the up arrow to change voices.

One final option in the parameters menu is the ampersand key (&). The function of this applies when you want to single out one section of your song to work on. To use, press the ampersand key and answer the prompts for the starting and ending note numbers you wish to section off. The computer will now begin playing just the notes within this range. This is especially helpful when chaining songs.

You'll probably spend lots of time fine-tuning each voice before you're ready to save the song. When you are ready, the dollar sign ($) will send you into the SAVE routine. Remember, make your file name 16 characters or less. Once the tune is saved, you'll be back in the parameters mode and you can continue to edit if you choose. In fact, you could redesign the song's entire parameters and save several versions.

Using Your Creations

Let's say you've got a song debugged and saved. How can you use it? To load your musical file into your Commodore 64, just type LOAD "song name",8,1 (change the 8 to a 1 for tapes). To play it in the immediate mode, just type SYS 49152. To play it from within a program do the same thing, SYS 49152. A SYS 65418 will stop your tune. You can, if you want, have a program call the song as a file but it's a whole lot simpler just to load it before your program, type NEW, load your program and go from there. Why the NEW? Because, for some strange reason, when you load into specific memory locations (accomplished by the "comma 1" in your load statement), you will get out-of-memory errors when you commence programming. NEW solves this, thus the reason for loading the song before the program.

The song, once SYSed, will play over and over unless you take measures to prevent it. If, in your program, you wish the song to play just one and stop, you should type this line: SYS 49152: POKE 49417,0.

Muzic Maker doesn't include ring modulation, synchronization or filtering, but don't let that stop you from using these features in your musical creations. You can try them out in the immediate mode by first loading and SYSing your tune and then poking in these advanced musical refinements. Once you find what you like, insert those commands into the program.

Don't let all these instructions scare you. Start simply. Type in Mary Had a Little Lamb before attempting Beethoven's 5th transposed to D-flat. You'll soon get the hang of this music creator. And you'll finally begin to realize some of the potential of your Commodore 64's sound interface device.

Chaining Songs

If you want to chain several songs together and then have the program control which is to be played, a few more POKEs are required. First, when composing the songs, be sure to finish each song with a rest (£) in each voice and make each voice contain the same number of notes. For instance, you may find that voice three has only 42 notes while voice 1 and 2 have 48, because the notes have different durations. Add a 49th rest to the first two voices and then 7 rests to voice three. That way, in the next song all three voices will begin with note number 50. Also, be sure to write down the note number for each voice's beginning and ending.

If you want the two songs to play one after the other, instead of just one or the other, you need to make your tacked-on rests equal in count for all three voices. This means, for the example above, you should make the rests for voices one and two a whole note, the first six rests for voice three eighth notes, and the final a quarter note. The total count then added to each voice would be equal to one whole-note rest.

Finally, to play just one particular tune within your program, you'll need to know the starting and ending note numbers of the tune you wish to select. Then, before SYSing 49152, type this line: POKE 49433,SN: POKE 49408, SN: POKE 49417,EN. SN should be the starting number of your selection minus one. EN will be the ending number of your selection.

Thus, if you have a tune that begins on note 73 and ends on note 132, you'll POKE 49433,72, POKE 49408, 72: and POKE 49417,132. To have the song play through just once, be sure to add POKE 49417,0 immediately following your SYS 49152.

You'll probably need to experiment before you can pick and play songs of your choice, but by studying what's written here and the accompanying program explanation chart, you should be able to let your program start and stop songs whenever and wherever you want.

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Muzic Maker

```
3 PRINT"[CLEAR,DOWN]MUZAK-MAKER BY
  MARK JORDAN"'BASJ
4 PRINT"[DOWN]JUST FOLLOW THE
  PROMPTS"'BABJ
8 FOR T=1 TO 7000:NEXT'EHWJ
10 IF A$="*"THEN FOR T=1 TO 3
   :F(T)=PEEK(49416+T):E(T)=F(T)-1
   :NEXT:GOTO 90'NHTM
15 PRINT"[CLEAR,DOWN2]","[SPACE2]
   PLEASE STAND BY"'BBOH
20 POKE 53281,1:POKE 53280,1
   :POKE 55279,10'DYTE
25 DIM NV$(11),NF$(11),N1$(11)'BXAI
30 FOR T=0 TO 11:READ NV$(T):NEXT'FMQE
35 FOR T=0 TO 11:READ NF$(T):NEXT'FMAJ
40 FOR T=0 TO 22:READ A:POKE 704+T,A
   :NEXT:FOR T=23 TO 63:POKE 704+T,0
   :NEXT'NDJO
45 FOR T=49152 TO 49407:READ A
   :POKE T,A:NEXT'GSKM
50 FOR T=49568 TO 49637:READ A
   :POKE T,A:NEXT'GSBI
55 M=155:DA=49424:RS=49425:UP=49421
   :HP=49422:F(1)=1:F(2)=1:F(3)=1'IEWX
60 DIM N$(3,M),OC(3,M),D(3,M),NP(3,M),
   DU(3,M)'BNPK
65 SC$="[RIGHT10]":S$="[SPACE10]"
   :SP$=SC$+S$+S$+S$:S1$=S$+S$+S$+S$'
   KGKX
70 N$="[HOME,DOWN25]"'BCXF
75 CB$=LEFT$(N$,19)+S1$+S1$+S1$+S1$'G
   WUQ
80 GOSUB 130'BDHF
85 GOSUB 890'BDUK
90 GOSUB 825'BDSG
95 GOSUB 305'BDLL
100 GOSUB 850'BDQV
105 GOSUB 315'BDMB
110 GOSUB 135'BDMW
115 GOSUB 650'BDOC
120 GOSUB 150'BDJX
125 END'BACC
130 SYS 65418:S=54272:FOR L=S TO S+24
    :POKE L,0:NEXT:RETURN'JYXI
135 POKE 2,4:POKE V+21,0'DJJG
140 FOR T=1 TO N:POKE 49416+T,E(T)+1
    :POKE 49413+T,0:POKE 49407+T,
    E(T)+1:NEXT'MOMP
145 POKE 49433,0:SYS 49152:RETURN'DOII
150 FOR M=1 TO N:W=(M-1)*7'GKQG
155 POKE 1307,M+176'CJJI
160 Q=(M-1)*4:AD(M)=PEEK(DA+W)
    :SR(M)=PEEK(RS+W)'JDLN
163 PU(M)=PEEK(UP+W):PH(M)=PEEK(HP+W)
    'GVXN
165 GET A$:IF A$=""THEN 165'EILK
170 IF A$="D"THEN AD(M)=(AD(M)+1)AND
    255'GSCJ
175 IF A$="A"THEN AD(M)=(AD(M)+16)AND
    255'GTWP
180 IF A$="R"THEN SR(M)=(SR(M)+1)AND
    255'GSYL
185 IF A$="S"THEN SR(M)=(SR(M)+16)AND
    255'GTEQ
190 IF A$=CHR$(133)THEN WF(M)=17'FOBK
195 IF A$=CHR$(134)THEN WF(M)=33'FOAP
200 IF A$=CHR$(135)THEN WF(M)=65'FOGC
205 IF A$=CHR$(136)THEN WF(M)=129'FPGH
210 IF A$="0"THEN WF(M)=0'EIAB
215 IF A$="&"THEN GOSUB 910'EFAF
230 IF A$="[^]"THEN 300'DFIC
235 IF A$="P"THEN PU(M)=PU(M)+16
    :IF PU(M)>255 THEN PU(M)=0'JEER
240 IF A$="H"THEN PH(M)=PH(M)+1
    :IF PH(M)>15 THEN PH(M)=0'JCQM
245 IF A$="[BACK ARROW]"THEN GOSUB 130
    :GOSUB 535:SYS 49152'GPLM
250 IF A$="+"THEN GOSUB 130
    :PRINT"[CLEAR]":GOTO 100'GKFH
255 IF A$="$"THEN GOSUB 130:GOSUB 870
    :GOSUB 650'GNLM
260 IF A$="1"OR A$="2"OR A$="3"THEN
    GOSUB 130:GOSUB 525:SYS 49152'KTIM
265 PRINT LEFT$(N$,18)'CHJJ
270 PRINT"DECAY[SPACE3]=[SPACE3,LEFT3]
    "AD(M)AND 15'CHUK
273 PRINT"ATTACK[SPACE2]=[SPACE3,
    LEFT3]"(AD(M)AND 240)/16'DMTO
275 PRINT"SUSTAIN =[SPACE3,LEFT3]
    "(SR(M)AND 240)/16'DMAR
277 PRINT"RELEASE =[SPACE3,LEFT3]
    "SR(M)AND 15'CHTR
280 POKE 49413+M,WF(M):POKE DA+W,AD(M)
    :POKE RS+W,SR(M)'GHIP
285 POKE UP+W,PU(M):POKE HP+W,
    PH(M)'ETTQ
290 PRINT"PULSE[SPACE3]=[SPACE4,LEFT4]
    "INT(PU(M)/16):PRINT"HI PULSE=
    [SPACE4,LEFT4]"PH(M)'EPDV
295 GOTO 165'BDLL
300 NEXT:GOTO 150'CESX
305 INPUT"[CLEAR,DOWN2]
    HOW MANY VOICES (1 - 3)[RIGHT3]3
    [LEFT3]";N'BCSL
310 PRINT"[CLEAR]":RETURN'CBTY
315 FOR J=1 TO N:K=E(J):DU(J,0)=4
    :OC(J,0)=4:N$(J,0)="C"'HKSP
320 K=K+1:TN=TN+1:Z=0'FMNF
325 GOSUB 385:GOSUB 440:GOSUB 465'DLQH
330 LI=10:GOSUB 845:PRINT,"[L. BLUE]
```

```
    CHECK NOTE POSITION"
    :GOSUB 510'EOVL
335 PRINT,"[DOWN,RED]PRESS
    :[SPACE2,RVS] [BACK ARROW] [RVOFF]
     TO REDO"'BBLL
340 PRINT,"[SPACE8,RVS] * [RVOFF]
     TO END VOICE"J'BCUH
345 PRINT,"[GRAY1]TYPE ANY OTHER KEY
    TO CONTINUE[L. BLUE]"'BBCQ
350 GET A$:IF A$=""THEN 350'EIHG
355 GOSUB 130'BDHI
360 IF A$="*"THEN 375'DFTG
365 IF A$="[BACK ARROW]"THEN 325'DFQL
370 GOTO 320'BDEF
375 E(J)=K:NEXT J:GOSUB 790'DLXN
380 RETURN'BAQF
385 PD=DU(J,K-1)'CKEN
390 LI=6:GOSUB 845:PRINT,"[L. BLUE,
    RVS]NOTE "K"[LEFT] , VOICE[SPACE3,
    LEFT3]"J'DLNR
395 PRINT,"[DOWN,RVS]NOTE
    DURATION"'BBAP
400 PRINT,"[DOWN,GREEN,RVS]
     1 = WHOLE NOTE[SPACE7]",,
    " 2 = HALF NOTE[SPACE8]";'BEMI
405 PRINT,,"[RVS] 4 = QUARTER NOTE,
     ETC"'BCJJ
410 PRINT,"ADD PERIOD FOR DOTTED
    NOTES"'BBCH
415 PRINT,"[DOWN,GRAY3]
    (PREVIOUS DURATION:[SPACE2,GRAY2]
    "PD")"'BDCM
420 X=PD:GOSUB 640:DU(J,K)=X
    :X$=STR$(X)'FWTI
425 IF VAL(X$)<1 THEN X=VAL(MID$(X$,
    3)):Z=1/X*TE'KUBQ
430 D(J,K)=1/X*TE*2-4+Z'GNRI
435 RETURN'BAQG
440 PO=OC(J,K-1)'CKIF
445 LI=12:GOSUB 845:PRINT,"[RVS,
    L. BLUE]OCTAVE (0 - 7)"'DKHO
450 PRINT,"[DOWN,GRAY3]
    (PREVIOUS OCTAVE WAS [GRAY2]"PO")
    [GRAY1]"'BDWM
455 X=PO:GOSUB 640:OC(J,K)=X'DQQN
460 RETURN'BAQE
465 PN$=N$(J,K-1):Y$=PN$'DREO
470 LI=11:GOSUB 845:PRINT,"[L. BLUE,
    RVS]NOTE[SPACE2](A - G) "
    :PRINT,"[RVS] + [RVOFF]SHARP [RVS]
     - [RVOFF]FLAT"'EMVS
475 PRINT,"[GRAY3,DOWN]
    (PREVIOUS NOTE WAS [GRAY2]"PN$")
    [GRAY1]"'BEVS
480 PRINT CB$:INPUT"[HOME,DOWN19,
    SPACE10]";Y$'CHDL
485 IF Y$="[POUND]"THEN 495'DFUO
490 IF LEFT$(Y$,1)<"A"OR LEFT$(Y$,
    1)>"G"THEN 480'HPGP
495 N$(J,K)=Y$:GOSUB 740'CNVQ
500 POKE V+1,141-((28*(OC(J,
    K)-4))+D*4)'HYRI
505 RETURN'BAQE
510 POKE S+5,132:POKE S+6,132'ENFF
515 POKE S,((NP(J,K)/256)-INT(NP(J,
    K)/256))*256:POKE S+1,INT(NP(J,
    K)/256)'KWIV
520 POKE S+4,33:POKE S+24,15
    :RETURN'FNGG
525 VO=VAL(A$):IF VO>N THEN
    RETURN'GKLM
530 H=PEEK(49407+VO):GOTO 545'EOVH
535 INPUT"[CLEAR]ALTER WHICH VOICE";V$
    :VO=VAL(V$):IF VO<1 THEN VO=1'HRCV
540 H=1:INPUT"[CLEAR]START WITH WHAT
    NOTE";H'CFPL
545 FOR K=H TO E(VO):J=VO:Z=0'FOUO
550 IF D(J,K)=0 THEN 560'DKFI
555 PD=DU(J,K):PO=OC(J,K):PN$=N$(J,K)
    :Y$=PN$'ELYU
560 PRINT"[CLEAR]","[LEFT2]PRESS [RVS]
     [BACK ARROW] [RVOFF]
     TO ALTER NOTE"'BBVO
563 PRINT,"[LEFT3]ANY OTHER KEY TO
    CONTINUE"'BBRR
565 PRINT,"[DOWN3]NOTE[SPACE3]#"K" -
    [SPACE2]"PN$'BFFO
570 PRINT,"[DOWN]DURATION[SPACE2]
    - "PD'BDBK
575 PRINT,"[DOWN]OCTAVE[SPACE4]
    - "PO'BDLP
580 GET A$:IF A$=""THEN 580'EIML
585 IF A$="[BACK ARROW]
    "THEN GOSUB 600'EFDP
590 NEXT'BAEI
595 GOSUB 650:GOSUB 135:RETURN'DIEQ
600 PRINT"[CLEAR]":GOSUB 850:GOSUB 390
    :GOSUB 445:GOSUB 470'FQKG
605 J1=(J-1)*768:N1=NP(J,K)/256
    :IT=49664'GFOP
610 POKE IT+K-1+J1,D(J,K)
    :POKE IT+255+K+J1,(N1-INT(N1))
    *256'LJNP
615 POKE IT+511+K+J1,N1'ELHL
620 PRINT"PRESS [RVS] [BACK ARROW]
    [RVOFF] TO REDO, OTHERWISE ANY
    KEY":GOSUB 510'CENO
625 GET A$:IF A$=""THEN 625'EIML
630 IF A$="[BACK ARROW]"THEN 600'DFMG
635 GOSUB 130:RETURN'CEHJ
640 PRINT CB$:INPUT"[HOME,DOWN19,
    SPACE10]";X'CGQJ
645 RETURN'BAQJ
650 PRINT"[CLEAR]PRESS:[SPACE4,
    L. BLUE,RVS] A [RVOFF]
     TO INCREMENT ATTACK"'BAWP
655 PRINT,"[GREEN,RVS] D [RVOFF]
     TO INCREMENT DECAY"'BBRR
660 PRINT,"[PURPLE,RVS] S [RVOFF]
     TO INCREMENT SUSTAIN"'BBXO
665 PRINT,"[GRAY2,RVS] R [RVOFF]
     TO INCREMENT RELEASE"'BBFT
670 PRINT,"[GRAY3,RVS] P [RVOFF]
     TO INCREMENT LO PULSE"'BBXP
675 PRINT,"[CYAN,RVS] H [RVOFF]
     TO INCREMENT HI PULSE"'BBJU
```

```
680 PRINT"[RVS,ORANGE] VOICE
    :[RVOFF,SPACE3,CMDR +3,RVS] [^]
     TO CHANGE VOICES"'BABS
685 PRINT"[RVS,ORANGE,SPACE7,RVOFF,
    SPACE3,BLUE,CMDR +3,RVS]
    [BACK ARROW] TO ALTER (1 2
    3)"'BAIW
690 PRINT,"[GRAY2,CMDR +3,RVS]
     + TO APPEND[SPACE7]"'BBBQ
695 PRINT,"[GREEN,CMDR +3,RVS]
     $ TO SAVE[SPACE9]"'BBCU
700 PRINT,"[RED,CMDR +3,RVS]
     & TO PLAY SECTION "'BBTI
710 PRINT,"[L. BLUE,DOWN,RVS] F1
    [RVOFF] FOR TRIANGLE WAVE"'BBXJ
715 PRINT,"[GREEN,RVS] F3 [RVOFF]
     FOR SAWTOOTH WAVE"'BBSO
720 PRINT,"[PURPLE,RVS] F5 [RVOFF]
     FOR PULSE[SPACE4]WAVE"'BBAK
725 PRINT,"[L. BLUE,RVS] F7 [RVOFF]
     FOR NOISE"'BBMN
730 PRINT,"[GRAY2,RVS] 0[SPACE2,RVOFF]
     TO SHUT OFF VOICE"'BBOL
735 POKE V+21,0:RETURN'DGEM
740 C=0:D=0'CFHH
745 IF N$(J,K)="[POUND]"THEN NP(J,K)=1
    :GOTO 785'FTPR
750 IF N$(J,K)=N1$(C)THEN NP(J,
    K)=268.234375*(1.059465^C)*2^OC(J,
    K):GOTO 785'JDOX
755 IF SF$="-"THEN 780'DGJO
760 ON C+1 GOTO 770,765,770,765,765,
    770,765,770,765,770,765,765'DYJS
765 D=D+1'CDVO
770 C=C+1:IF C>11 THEN 785'FKUN
775 GOTO 750'BDLO
780 ON C+1 GOTO 765,770,765,770,765,
    765,770,765,770,765,770,765'DYJU
785 RETURN'BAQO
790 IT=49664:FOR I=1 TO N'ELCP
795 FOR T=F(I)TO E(I)'DJIS
800 POKE IT+T-1,D(I,T)'DLBG
805 POKE IT+255+T,((NP(I,
    T)/256)-INT(NP(I,T)/256))*256'ILRU
810 POKE IT+511+T,INT(NP(I,
    T)/256)'FTQK
815 NEXT:IT=IT+768:NEXT'EJDM
820 RETURN'BAQE
825 SF$="-":INPUT"[CLEAR,DOWN2,GRAY2]
    PROGRAM IN SHARPS (+)[RIGHT]
    OR FLATS (-)[RIGHT3]-[LEFT3]";SF$
    :'CJTY
830 IF SF$="+"THEN FOR T=0 TO 11
    :N1$(T)=NV$(T):NEXT'IVFO
835 IF SF$="-"THEN FOR T=0 TO 11
    :N1$(T)=NF$(T):NEXT'IVQT
837 TE=64:INPUT"[CLEAR,DOWN2]
    TEMPO (FAST,MED,SLOW)[RIGHT3]M
    [LEFT3]";TE$'CJAY
838 IF TE$="S"THEN TE=80'EHRR
839 IF TE$="F"THEN TE=48'EHIS
840 RETURN'BAQG
845 PRINT LEFT$(N$,7):FOR T=1 TO 12
    :PRINT SP$;:NEXT:PRINT LEFT$(N$,
    LI):RETURN'KBWW
850 V=53248:POKE 2040,11
    :POKE V+21,1'EUUN
855 POKE V,33:POKE V+1,141:POKE V+2,26
    :POKE V+39,0'HXOV
860 PRINT LEFT$(N$,6)'CGIK
865 FOR T=1 TO 2:FOR I=1 TO 5
    :PRINT"[GRAY1,CMDR P5]":NEXT:PRINT
    :NEXT:RETURN'LMJB
870 INPUT"[CLEAR,DOWN]NAME OF SONG";
    SO$'BEWO
875 OPEN 1,8,1,SO$:FOR T=49408 TO T+2
    :POKE T,0:NEXT'HXSX
880 POKE 780,78:POKE 78,0:POKE 79,192
    :POKE 781,0:POKE 782,203
    :SYS 65496'GNQV
885 GOSUB 135:CLOSE 1:RETURN'DGXR
890 PRINT"[CLEAR,DOWN]TO LOAD AND
    APPEND PRESS [RVS] * "'BAXT
895 GET A$:IF A$=""THEN 895'EIVU
900 IF A$="*"THEN INPUT"SONG TITLE";T$
    :LOAD T$,8,1'FMWL
905 SYS 49616:RETURN'CGLK
910 INPUT"[CLEAR,DOWN]STARTING NOTE";
    SS'BDQJ
915 SE=E(1)+1:INPUT"ENDING NOTE";
    SE'DLVQ
920 POKE 49433,SS:POKE 49417,SE
    :POKE 49408,SS:POKE 49409,SS
    :POKE 49410,SS'FTMS
925 GOSUB 130:GOSUB 650:SYS 49152
    :RETURN'EOOP
930 DATA C,C+,D,D+,E,F,F+,G,G+,A,A+,
    B'BDKM
935 DATA C,D-,D,E-,E,F,G-,G,A-,A,B-,
    B'BDSR
940 DATA 0,126,0,1,255,128,3,255,192,
    15,255,240,15,255,240,3'BBTR
945 DATA 255,192,1,255,128,0,126'BXSQ
950 DATA 120,169,13,141,20,3,169,
    192'BCFN
955 DATA 141,21,3,88,96,173,0,193'BYQS
960 DATA 205,9,193,208,23,173,25,
    193'BCSO
965 DATA 141,0,193,141,1,193,141,
    2'BATT
970 DATA 193,234,234,234,169,0,133,
    251'BEEQ
975 DATA 133,252,133,253,165,251,240,
    20'BFRV
980 DATA 198,251,165,252,240,78,198,
    252'BFBR
985 DATA 165,253,208,3,76,194,192,
    198'BDDW
990 DATA 253,76,160,193,173,3,193,
    240'BDRR
995 DATA 20,173,6,193,41,254,141,
    4'BAFW
1000 DATA 212,169,0,141,3,193,165,
     2'BAEX
1005 DATA 133,251,76,48,192,172,0,
     193'BCSD
```

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BY MICHAEL LEIDEL

PreBASE

A BASIC Preprocessor for the Commodore 64

Although BASIC is one of the most popular computer languages, it lacks certain features found in more powerful languages like Pascal or C. For instance, although most programming languages use line numbers to sequence lines of a program, BASIC also uses line numbers as labels—targets of branch statements. This not only decreases the program's readability, but also makes re-sequencing lines a major task, since all branch statements must be modified each time line numbers are changed. To overcome this deficiency, BASIC needs to incorporate the use of English labels for branching purposes, keeping line numbers independent of the language itself.

A second weakness in BASIC shows up when in the course of program development certain routines are repeated. It is often desirable to keep these routines separate so they can be included in more than one program or can be repeated within a program. These routines should be able to be included in a program using one simple command, rather than having to be retyped.

Third, other languages, like Pascal, used structured control constructs. Although BASIC does have the FOR-NEXT construct, it lacks structures like WHILE-ENDWHILE, LOOP-UNTIL, or LOOP-ENDLOOP. Use of GOTO and IF in BASIC can simulate these structures, but then readability is lost. To make BASIC's control logic more readable, we need the kinds of control structures found in other languages.

Fourth, although REM statements make up for some of BASIC's other shortcomings, they take up memory space and slow down execution time. The same goes for use of spaces. Use of spaces greatly improves program readability, but BASIC has to process each space, just as it does a REM statement. We need a way to have comments and use spacing, but not lose memory or execution time.

> *PreBASE improves the readability of your BASIC programs and also helps them run faster.*

PreBASE Solves the Problems

"PreBASE," the program at the end of this article, is a BASIC preprocessor that addresses these four weaknesses in BASIC. A language preprocessor does an initial interpretation of the source program before releasing it to its normal interpreter or compiler.

In this case, PreBASE fixes the problems discussed above. It allows use of English labels for branching, instead of line numbers. Line numbers are used only for sequencing lines. It provides a directive for including prewritten library routines and allows the use of WHILE-ENDWHILE, LOOP-ENDLOOP, or LOOP-UNTIL structured control constructs. It also removes all REM statements and extra spaces.

Although PreBASE does not turn BASIC into Pascal, it does add some highly desirable features found in structured languages. The end product, however, is a normal BASIC program. That's because PreBASE is a programming tool, and its advantages are realized in the program development process.

Writing a Program Using PreBASE

Writing a program using PreBASE is just like writing a regular BASIC program, except there are a few more features and a few more rules.

Line numbers should be used only for sequencing lines, never after a THEN, GOTO or GOSUB. Instead, an English label, like PROCESS-UPDATE, should follow a GOTO or GOSUB. Labels, however, should never follow a THEN, although other BASIC statements may.

The target label should be the only entry on a line. It may be composed of any combination of regular or special characters, and must be unique. Resequencing line numbers will not affect program control logic.

Nothing must come before or after a structured control construct on a line. The conditional following WHILE or UNTIL must be preceded by one space, and nothing must follow the conditional.

Nesting may not exceed ten levels. WHILE-ENDWHILE provides a condition check at the beginning of a loop. LOOP-UNTIL provides a condition check at the end of a loop. And LOOP-ENDLOOP provides a closed loop that must be exited by a GOTO.

PreBASE will merge in (include) other PreBASE files during its processing cycle. To use this feature, enclose the name of the file in quotes and then in square brackets. Nothing else must precede or follow this directive on the line. For example,

```
100 ["filename"]
```

will merge in the program file at line 100 of the program using this directive. The file used in the directive cannot itself use an "include" directive.

Any line that is not a label, a structured control construct, an "include" directive, or a REM statement *must begin with a period.* This distinguishes a regular line from a line requiring special attention, and allows for initial spacing. A shifted space may be used instead of a period to begin a regular line in the PreBASE program. This gives a cleaner appearance, and still allows for indentation. Caution must be exercised, however, because if the line is re-edited, the editor will remove the shifted space. Therefore, each time a line is edited, the shifted space must be replaced. The period does not require this extra attention when a line is edited.

In its translation process, PreBASE removes all REM statements and extra spaces, turns structured constructs into regular BASIC, replaces labels with the appropriate line numbers and integrates any "included" routines into a normal BASIC program file. The resulting program is written to disk with the name of the PreBASE program source file, plus the extension ".BAS" to mark it as a PreBASE file.

PreBASE will not check normal BASIC syntax or logic errors, so your program will have to be tested for these. However, PreBASE will indicate certain errors relevant to its special features, as explained in the next section. If PreBASE finds these kinds of errors, the final program is not produced, and the errors are listed.

How to Use PreBASE

PreBASE consists of two programs, both of which must be on the same disk, along with the program file to be processed. The program titled PreBASE is the first pass. This program requests the date, the name of the PreBASE program file to be processed, the beginning line number and the increment for the BASIC output file. It then parses through both the PreBASE source file and any "included" library files, and builds a file called SYMTBL on disk.

A possible error from this first pass would be DUPLICATE LABEL. This means you have used the same name for two different branch labels. To correct this, change one of the labels. Otherwise, the program will not execute the next phase.

Assuming, however, that all is well in pass number one, PreBASE will load and execute the program titled PASS2, which does the rest of the work. Using the information from the SYMTBL file, it builds a normal BASIC program. All structured constructs are converted into regular BASIC statements and branch labels are made to correspond to line numbers. Any library routines that were merged are also integrated. Note, however, that the PreBASE source file will still contain the directive used to include those routines. The size of the final BASIC program depends on how many REM statements and spaces were removed, and how many "include" directives were used.

Possible errors in PASS2 are displayed at the end of processing. If errors occur, the BASIC program file is not created. The error list indicates the line number in the PreBASE source file where the error occurred. After it finds ten errors, PASS2 will quit and list them. These are the possible errors:

Incorrect formation of a construct or label:

LOOP ERROR
ENDLOOP ERROR
INVALID LABEL
UNTIL ERROR
ENDWHILE ERROR

Missing part of a structured construct:

NO MATCHING LOOP
MISSING LOOP
NO MATCHING ENDWHILE
NO MATCHING WHILE

Reference to a nonexistent label:

UNDEF LABEL

In some cases, if a line does not begin with either a REM, a label, a structured construct, an "include" directive, or a period, PASS2 may crash. If this happens and you want to examine the error list, GOTO 8020. Examining the SYMTBL file may also be helpful. To do this, type, in immediate mode:

FORX = 1TOLC:?LBL$
(X),NUM$(X):NEXT

The last thing PASS2 does is create two special REM statements as the last two lines of the newly generated BASIC program. The first REM contains the name of the program and the date. The second REM contains the ID string you code into line 5 of the PASS2 program. For example:

5 ID$ = "(C) MIKE LEIDEL 1986"

would create a REM comment containing "(C) MIKE LEIDEL 1986." These REM's will have invalid line numbers so they cannot be deleted from the program. ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

PreBASE

```
8 TI$="000000":POKE 53281,11
  :POKE 53280,12:PRINT"[GRAY3]"
  :EW$=CHR$(128)+"WHILE"'HGHU
10 PRINT"[CLEAR,DOWN,WHITE,SPACE2,
   SHFT *4] [RVS]PREBASE BASIC
   PREPROCESSOR[RVOFF] [SHFT *4,GRAY3]
    [DOWN]"'BAJN
11 EL$=CHR$(128)+"LOOP"'DICD
12 PRINT"[WHITE,SPACE11,SHFT *3] [RVS]
   PASS 1[RVOFF] [SHFT *3,GRAY3,DOWN]"
   :PRINT"[WHITE,SPACE16,SHFT *4,
   GRAY3,DOWN]"'CBSP
13 Z$=CHR$(0):S$=CHR$(160)
   :INPUT"TODAY'S DATE MM/DD/YY";
   DT$'FSVM
14 IF LEN(DT$)<>8 THEN 13'FICG
15 PRINT"[DOWN2] ENTER NAME OF SOURCE
   PROGRAM:":INPUT"[RIGHT7,DOWN]";P$
   :IF P$=""THEN 15'FJNQ
16 INPUT"[DOWN]BEGINING LINE# FOR
   BASIC";BL:INPUT"INCREMENT";BI
   :IF BI=0 THEN BI=10'GPJT
17 INPUT"[DOWN]CONTINUE (Y[CR]/N)";C$
   :IF C$="N"THEN CLR:END'GHHO
18 IF BL=0 THEN BL=100'EIOJ
20 PRINT"[DOWN]PROCESSING -":PRINT
   :F$="M":CH=2:LC=1:LL=128
   :IN=BL-BI'IAXN
25 DIM LBL$(LL),NUM$(LL)'BRYH
30 OPEN 1,8,15:OPEN 2,8,2,"0
   :"+P$+",P,R":INPUT#1,E,E$
   :IF E<20 THEN 45'IDVL
35 PRINT"[CLEAR] FILE ERROR";E;E$
   :STOP'CGOK
45 GOSUB 500:GOSUB 500'CHAH
60 GOSUB 500:D$=C$:GOSUB 500
   :IF(D$=Z$)AND(C$=Z$)THEN 900'IDOM
66 GOSUB 600:GOSUB 500'CHBK
70 IF C$="["THEN GOSUB 800:L$=""
   :IN=IN-BI:GOTO 60'ISKM
72 IF ASC(C$)=143 THEN GOSUB 3000
   :IN=IN-BI:GOTO 60'IVTO
73 IF C$=" "THEN 76'DEPI
74 IF C$="."THEN 76'DEFJ
75 GOSUB 4000:GOTO 60'CHVK
76 GOSUB 3000:GOTO 60'CHUL
500 GET#CH,C$:IF C$=""THEN C$=Z$'FNDE
510 RETURN'BAQA
```

```
600 GET#CH,C$,C$:IN=IN+BI:RETURN'EROG
800 LF$="":REM *** OPEN LIBRARY FILE
    **'CYFJ
805 GOSUB 500:IF C$<>CHR$(34)THEN
    PRINT#1,"I0":PRINT"[DOWN]
    FATAL ERROR ON COPY":END'JOGV
810 GOSUB 500:IF ASC(C$)=34 THEN
    GOSUB 500:GOSUB 500:PRINT
    :GOTO 820'JWKM
815 LF$=LF$+C$:PRINT C$;:GOTO 810'EQAO
820 OPEN 5,8,5,"0:"+LF$+",P,R"
    :INPUT#1,E,E$:IF E<20 THEN
    830'HXRO
825 PRINT"[CLEAR]FILE ERROR";E;LF$;E$
    :PRINT#1,"I":STOP'DNMR
830 F$="L":CH=5:GOSUB 500:GOSUB 500
    :RETURN'FPXL
900 IF F$="L"THEN CLOSE 5:F$="M":CH=2
    :GOTO 60'HNEK
905 CLOSE 2:CLOSE 1'CDUJ
910 IF ER>0 THEN PRINT"[DOWN2] ERRORS
    : PASS 2 WILL NOT BE EXECUTED."
    :END'FEJR
920 OPEN 1,8,15,"S0:SYMTBL"'BHVJ
930 OPEN 2,8,2,"SYMTBL,S,W"
    :INPUT#1,E,E$'CNEM
940 IF E<>0 THEN PRINT"[CLEAR]
    FILE ERROR ",E;E$:STOP'GIKQ
945 PRINT#2,BL;",";BI;",";DT$;",";
    P$'BROR
950 PRINT#2,LC-1:FOR X=1 TO LC-1
    :PRINT#2,LBL$(X);",";NUM$(X)
    :NEXT X:CLOSE 2,1'JLAW
960 PRINT"[CLEAR,GRAY1]LOAD";CHR$(34);
    "PASS2";CHR$(34);",8[GRAY3]"'DMQS
980 POKE 631,19:POKE 632,13
    :POKE 633,82:POKE 634,85
    :POKE 635,78:POKE 636,13'GQOW
990 POKE 198,6:END'CGJO
3000 GET#CH,C$:IF C$<>""THEN 3000'FNTA
3030 RETURN'BAQX
4000 LBL$(LC)=LBL$(LC)+C$
     :GOSUB 500'DWSC
4015 IF NOT(C$=Z$OR C$=" ")THEN
     4000'GMKI
4020 IF LBL$(LC)="LOOP"THEN
     LBL$(LC)="":IN=IN-BI:RETURN'HYRJ
4021 IF LBL$(LC)<>EW$THEN 4025'EPEE
4022 E%=E%+1:LBL$(LC)=EW$+STR$(E%)
     :NUM$(LC)=STR$(IN+BI)
     :LC=LC+1'KRKQ
4023 IF LC>=LL THEN 4040'EIGF
4024 RETURN'BAQC
4025 IF LBL$(LC)="UNTIL"THEN GOSUB
     3000:LBL$(LC)="":RETURN'GWCN
4026 IF LBL$(LC)=EL$THEN LBL$(LC)=""
     :RETURN'FUGL
4028 IF LBL$(LC)="WHILE"THEN GOSUB
     3000:LBL$(LC)="":RETURN'GWIQ
4030 FOR X=1 TO LC:IF LBL$(X-1)<>LBL$
     (LC)THEN NEXT X:GOTO 4035'KCLL
4032 PRINT"ERROR DUPLICATE LABEL--> ";
     LBL$(LC):ER=ER+1'DPHN
4035 NUM$(LC)=STR$(IN):IN=IN-BI
     :LC=LC+1:IF LC<LL THEN
     RETURN'KFPS
4040 PRINT"[CLEAR]WARNING- TOO MANY
     LABELS - ADJUST LL"PRINT#1,"I"
     :CLOSE 1:STOP'EFDN
```

END

PASS2

```
8 POKE 53281,11:POKE 53280,12
  :PRINT"[GRAY3]":EL$=CHR$(128)+"LOOP"
  :N0$=CHR$(0)'IJLU
9 GS$=CHR$(141):GT$=CHR$(137)
  :RM$=CHR$(143):Q$=CHR$(34)'IILT
10 EW$=CHR$(128)+"WHILE"'DIBC
11 PRINT"[CLEAR,DOWN,WHITE,SPACE2,
   SHFT *3] [RVS]PREBASE BASIC
   PREPROCESSOR[RVOFF] [SHFT *3,GRAY3]
   "'BALM
12 PRINT"[DOWN,WHITE,SPACE11,SHFT *3]
    [RVS]PASS 2[RVOFF] [SHFT *3,GRAY3]
    [DOWN]":PRINT"[WHITE,SPACE16,
   SHFT *4,GRAY3]"'CBBP
15 OPEN 2,8,2,"SYMTBL":INPUT#2,BL,BI,
   DT$,P$,LC:DIM NUM$(LC),LBL$(LC),
   SL$(80)'DATQ
18 FOR X=1 TO LC:INPUT#2,LBL$(X),
   NUM$(X):NEXT X:CLOSE 2
   :IN=BL-BI'IICS
20 PRINT"[DOWN2]PROCESSING ";P$:PRINT
   :F$="M":CH=2'ELBG
30 OPEN 1,8,15:OPEN 2,8,2,P$+",P,R"
   :INPUT#1,E,E$:IF E<20 THEN 40'HDYJ
35 PRINT"[CLEAR] FILE ERROR";E
   :PRINT#1,"I":STOP'DGBK
40 OPEN 3,8,3,"0:"+P$+".BAS,P,W"
   :INPUT#1,E,E$:IF E=0 THEN 45'HUPK
41 CLOSE 3:PRINT#1,"S0:"+P$+".BAS"
   :GOTO 40'FJJH
45 PRINT#3,CHR$(1);CHR$(8);'DKGJ
48 GOSUB 500:GOSUB 500'CHAK
50 P=1'BCAC
60 GOSUB 500:D$=C$:GOSUB 500
   :IF D$=N0$AND C$=N0$THEN 900'IBYM
66 GOSUB 600:GOSUB 500'CHBK
70 IF C$="["THEN GOSUB 800
   :GOTO 50'FISH
72 IF C$=RM$THEN GOSUB 3000:IN=IN-BI
   :GOTO 50'HTNN
73 IF NOT(C$="."OR C$=" ")THEN GOSUB
   4000:GOTO 50'INMN
74 GOSUB 500:IF C$=" "THEN IF Q=0
   GOTO 74'HKUN
75 SL$(P)=C$:P=P+1:IF C$=N0$THEN
   GOSUB 700:GOTO 50'IYLS
80 IF C$=GS$OR C$=GT$THEN 5000'FOKK
85 IF C$<>Q$THEN 74'EGUM
86 IF Q=1 THEN Q=0:GOTO 74'FHXO
87 Q=1:GOTO 74'CFWN
90 REM * CLOSED SUBROUTINES FOLLOW
   ***'BCNN
500 GET#CH,C$:IF C$=""THEN C$=N0$'FOIF
510 RETURN'BAQA
600 GOSUB 500:LS$=C$:GOSUB 500:HS$=C$
```

```
    :IN=IN+BI:SN=ASC(LS$)+256*ASC(HS$)
    :R=R+1'NVST
650 PRINT IN;"/";SN,:X=INT(IN/256)
    :HN$=CHR$(X):X=IN-256*X
    :LN$=CHR$(X):RETURN'MOLW
700 P=P-1:IF W=0 THEN W=P+5
    :GOTO 710'INBJ
705 W=P+4'CDEI
710 WT=WT+W:X=INT(WT/256)
    :HP$=CHR$(X+8):X=(WT-(X*256))
    :LP$=CHR$(X)'NQIV
715 IF EN>0 THEN RETURN'EDBK
720 PRINT#3,LP$;HP$;LN$;HN$;
    :FOR X=1 TO P:PRINT#3,SL$(X);
    :NEXT X:RETURN'HKQP
800 LF$="":REM *** OPEN LIBRARY FILE
    **'CYFJ
805 GOSUB 500:IF C$<>Q$THEN PRINT#1,
    "I":PRINT"[DOWN]MISSING QUOTE [?"
    :GOTO 8010'IQNU
810 GOSUB 500:IF C$=Q$THEN GOSUB 500
    :GOSUB 500:PRINT:GOTO 820'IUBL
815 LF$=LF$+C$:PRINT C$;:GOTO 810'EQAO
820 OPEN 5,8,5,"0:"+LF$+",P,R"
    :INPUT#1,E,E$:IF E<20 THEN
    830'HXRO
825 PRINT"[CLEAR]FILE ERROR";E;LF$;E$
    :PRINT#1,"I":STOP'DNMR
830 F$="L":CH=5:GOSUB 500:GOSUB 500
    :IN=IN-BI:RETURN'HWDO
900 IF F$="L"THEN CLOSE 5:F$="M":CH=2
    :GOTO 50'HNDK
905 IF EN>0 THEN 8010'DHKL
910 GOSUB 9000:PRINT#3,N0$;N0$;
    :CLOSE 2:INPUT#1,E:IF E>0 THEN
    920'HCRN
915 CLOSE 3:CLOSE 1:PRINT
    :PRINT"[DOWN] PROCESSED ";R;
    " RECORDS IN":PRINT SPC(12);'GNCV
917 PRINT LEFT$(TI$,2);" HRS/ ";
    MID$(TI$,3,2);" MIN/ ";RIGHT$(TI$,
    2);" SEC"'EDBX
918 END'BACM
920 PRINT"FILE ERROR ";E:STOP'CDNJ
3000 GET#CH,C$:IF C$<>""THEN 3000'FNTA
3030 RETURN'BAQX
4000 IF C$="L"OR C$="U"OR C$="W"OR
     C$=CHR$(128)THEN 4010'KRZH
4002 FOR X=1 TO LC:IF VAL(NUM$(X))=IN
     THEN IN=IN-BI:GOSUB 3000
     :RETURN'LDWL
4005 NEXT X'BBRB
4010 L$=C$'BELX
4015 GOSUB 500:IF C$=" "OR C$=N0$THEN
     4021'GPXI
4020 L$=L$+C$:GOTO 4015'DLWC
4021 IF L$<>"WHILE"THEN 4030'EGYE
4022 IF C$=" "THEN 6000:RETURN'EHXD
4023 GOSUB 8000:EM$(EN)="WHILE ERROR
     - ":IF C$<>N0$THEN GOSUB
     3000'HWIN
4024 RETURN'BAQC
4030 IF L$<>"LOOP"THEN 4050'EGNE
4035 IF C$<>N0$THEN GOSUB 8000
     :EM$(EN)="LOOP ERROR - "
     :GOSUB 3000:RETURN'IXNR
4040 LV=LV+1:LTN$(LV)=STR$(IN)
     :IN=IN-BI:RETURN'HBIL
4050 IF L$<>EL$THEN 4062'EJJF
4052 IF C$<>N0$THEN GOSUB 8000
     :EM$(EN)="ENDLOOP ERROR - "
     :GOSUB 3000:GOTO 4060'ICWR
4055 SL$(P)=GT$:P=P+1'DNJL
4057 IF LV<1 THEN GOSUB 8000
     :EM$(EN)="NO MATCHING LOOP - "
     :GOTO 4060'GUDU
4058 Y=LEN(LTN$(LV)):FOR X=1 TO Y
     :SL$(P)=MID$(LTN$(LV),X,1):P=P+1
     :NEXT X'KRBA
4060 SL$(P)=N0$:P=P+1:GOSUB 700
     :LV=LV-1:RETURN'HYFM
4062 IF L$="UNTIL"THEN 4071'DGBI
4063 IF L$=EW$THEN 7000'DJSI
4064 IF C$=N0$THEN IN=IN-BI
     :RETURN'GMCM
4066 GOSUB 8000:EM$(EN)="INVALID
     LABEL - ":GOSUB 3000:RETURN'ESUS
4071 IF C$=" "THEN 4075'DGIH
4072 GOSUB 8000:EM$(EN)="UNTIL ERROR
     - ":IF C$<>N0$THEN GOSUB
     3000'HWCR
4073 RETURN'BAQG
4075 SL$(P)=CHR$(139):P=P+1
     :SL$(P)=CHR$(168):P=P+1
     :SL$(P)="(":P=P+1'LRCA
4080 GOSUB 500:IF C$=N0$THEN 4086'ENBJ
4082 SL$(P)=C$:P=P+1:GOTO 4080'EROM
4086 SL$(P)=")":P=P+1:IF LV<1 THEN
     GOSUB 8000:EM$(EN)="MISSING LOOP
     -":GOTO 4060'JGFB
4087 SL$(P)=GT$:P=P+1'DNJQ
4088 Y=LEN(LTN$(LV)):FOR X=1 TO Y
     :SL$(P)=MID$(LTN$(LV),X,1):P=P+1
     :NEXT X'KRBD
4090 SL$(P)=N0$:P=P+1:GOSUB 700
     :LV=LV-1:RETURN'HYFP
5000 GOSUB 500:L$=""'CGAY
5010 GOSUB 500:IF C$=" "OR C$="."OR
     C$=","OR C$=N0$THEN 5020'KTFI
5015 L$=L$+C$:GOTO 5010'DLSH
5020 FOR E=1 TO LC:IF L$=LBL$(E)THEN
     5030'GSWG
5022 NEXT E:GOSUB 8000:EM$(EN)="UNDEF
     LABEL - ":GOTO 75'ERQK
5030 Y=LEN(NUM$(E)):FOR X=1 TO Y
     :SL$(P)=MID$(NUM$(E),X,1):P=P+1
     :NEXT X'KPTQ
5040 IF C$=","THEN SL$(P)=",":P=P+1
     :L$="":GOTO 5010'IUHL
5050 GOTO 75'BCTC
6000 SL$(P)=CHR$(139):P=P+1
     :SL$(P)=CHR$(168):P=P+1
     :SL$(P)="(":P=P+1'LRCP
6010 GOSUB 500:IF C$=N0$THEN 6030'ENSE
6020 SL$(P)=C$:P=P+1:GOTO 6010'ERJG
6030 SL$(P)=")":P=P+1:WV=WV+1
```

Continued on pg. 176

BY DAVID STEPHENS

3-D Sprite Scrolling *for the Commodore 64*

On a nice summer day, you walk into your local arcade and find everybody crowded around a new video game. You push your way through the mass of people and come face to face with the most awesome video game you've ever seen. After five hours, you finally get a chance to play it. You love it so much you decide that you are going to go home and program it. But when you begin to think about the details of the game, it hits you. Yes, that's right. "How am I ever to do the graphics?!"

One thing that bothers programmers is three-dimensional scrolling, or in other words, making an object look larger as it comes toward you. If you are working with sprites, a good solution seems to be creating a sprite definition for each size of the object. If you want to spend the next century doing it, that's your problem.

Instead, you can use these programs to create the extra definitions. The three programs—Ddata, Dmain and Ddisk—will handle all the work of creating the new definitions, storing them, and retrieving the information. I call the programs collectively "DeRes."

In order to use DeRes, you must have a disk drive and a joystick. You also need to save Ddata and Dmain on the same disk. Last of all, you should only use DeRes on bit patterns or regular color mode sprites.

Type in Ddata and then save it. Then type NEW and press the RETURN key. Repeat this procedure for Dmain and Ddisk. This insures that you have at least part of the program if something should go wrong.

Now load Ddata and run it. This program contains the machine code for DeRes. The program saves the information to a disk file named *Aile*. Now type NEW and press RETURN.

Load Dmain. Now list lines 1005-1020. These lines contain the data for the sprite to be compressed. Place the data statements of your sprite in these lines. Make sure that you leave no data from another sprite.

These three programs make three-dimensional scrolling much easier, so you can make your sprites look larger as they come toward you.

Whether or not you put new data statements in the program, go ahead and run the program. The data from the file *Aile* will be loaded, and the sprite data will be compressed or deresed. This is a process I have developed that takes bit patterns and compresses them into a smaller space but keeps the same general appearance as before.

When the data for your sprite is compressed, the image it then makes is reduced. In the program, the data is compressed and then saved in memory. Then the process is repeated. This is done until the sprite image is nothing more than a dot.

Insert a joystick into port one. The joystick is used to choose the functions that you want to use. These are:

Choose Sprites. The program generates 21 sprite definitions. You can pick the ones you want for your projects. The cursor is the large solid square located in the upper lefthand corner. Using the joystick, you may move the cursor onto any of the sprite definitions displayed. The definition the cursor is on will be shown in the large sprite at the top of the screen.

If you like the definition, press the fire button. The sprite definition will turn to cyan. If you later decide you do not like it, then move the cursor to it and press the fire button again. The sprite will then turn back to white. Only the cyan sprite definitions will be used in the other screens of the program.

In order to get to the menu, move the cursor to the upper righthand corner and then press the joystick up. The large sprite at the top of the screen now reads "stay." Move the joystick to the left to get the choice of menu. You may move the joystick to the right in order to get option "stay." Press the fire button when you have the choice you want on the screen.

Animation. This screen allows you to see the sprite definitions you chose in an animated sequence. The screen contains instructions.

Save data to disk. Make sure you do everything the screen tells you to do. This screen allows you to save the information for the sprite definitions to a disk file. The screen contains instructions.

Terminate the program. This option returns control of the computer to you. You may now change the sprite to be compressed or get rid of the program completely. If you enter the data for another sprite, just type in RUN when you have finished and press RETURN.

Now that you have the information saved to disk, how are you going to use it? When you write your program, you could load the data from the files, but that would mean you would have to save the program on the same disk that the files were on.

The easiest way to use the information is when it is in the form of data statements. That is where Ddisk comes in. Type NEW and press RETURN. Now load Ddisk. Insert the disk with the information you want converted to data statements. Now run the program. The program gives you a list of all the files created by Dmain that are on the disk. You may choose any file or the special options. The file you choose will be loaded and then converted to data statements. Any subsequent files will be started at the last line number of the last file.

If you choose the option "Continue listing," any files that weren't listed on the original menu will be listed. This will be useful only when there are more files than can be listed on one menu. If you choose "terminate session," you may save the data statements as a program. ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Ddata

```
10 PRINT"[CLEAR]":OPEN 2,8,2,"0
   :AILE,S,W"'CHHC
20 FOR T=49152 TO 49740:READ A
   :PRINT#2,A:NEXT'GSCF
30 FOR T=49845 TO 50424:READ A
   :PRINT#2,A:NEXT'GSCG
40 CLOSE 2:END'CCOB
1000 DATA 173, 60, 3, 141, 63, 0, 173,
      61, 3, 141, 64'BIKY
1002 DATA 0, 173, 62, 3, 141, 65, 0,
      173, 63, 3, 141'BHIB
1004 DATA 66, 0, 173, 64, 3, 141, 67,
      0, 173, 65, 3'BGWD
1006 DATA 141, 68, 0, 162, 0, 142, 74,
      3, 169, 0, 141'BIKF
1008 DATA 67, 3, 169, 128, 141, 68, 3,
      141, 69, 3, 169'BJLI
1010 DATA 0, 141, 70, 3, 141, 71, 3,
      141, 72, 3, 141'BHWA
1012 DATA 73, 3, 141, 76, 3, 172, 70,
      3, 177, 63, 45'BHDC
1014 DATA 68, 3, 240, 3, 238, 72, 3,
      24, 78, 68, 3'BFIE
1016 DATA 144, 5, 169, 1, 141, 76, 3,
      238, 73, 3, 24'BHAG
1018 DATA 173, 67, 3, 109, 66, 3, 141,
      67, 3, 201, 24'BIVI
1020 DATA 240, 5, 16, 3, 76, 206, 192,
      56, 169, 24, 160'BKWC
1022 DATA 1, 200, 237, 66, 3, 144, 3,
      76, 122, 192, 140'BKFE
1024 DATA 75, 3, 56, 173, 73, 3, 160,
      0, 200, 237, 75'BIVF
1026 DATA 3, 144, 3, 76, 140, 192,
      140, 75, 3, 173, 72'BJQI
1028 DATA 3, 205, 75, 3, 240, 5, 16,
      3, 76, 175, 192'BHYJ
1030 DATA 172, 71, 3, 177, 65, 13, 69,
      3, 145, 65, 24'BIJC
1032 DATA 78, 69, 3, 144, 8, 169, 128,
      141, 69, 3, 238'BJTF
1034 DATA 71, 3, 56, 173, 67, 3, 233,
      24, 141, 67, 3'BHAG
1036 DATA 162, 0, 142, 72, 3, 142, 73,
      3, 173, 76, 3'BHPI
1038 DATA 208, 3, 76, 71, 192, 169,
      128, 141, 68, 3, 238'BLKL
1040 DATA 70, 3, 238, 74, 3, 169, 0,
      141, 76, 3, 173'BHBD
1042 DATA 74, 3, 201, 3, 208, 38, 173,
      70, 3, 141, 71'BIOF
1044 DATA 3, 169, 128, 141, 69, 3,
      169, 0, 141, 72, 3'BIBH
1046 DATA 141, 73, 3, 141, 67, 3, 141,
      74, 3, 141, 76'BISJ
1048 DATA 3, 173, 70, 3, 201, 63, 208,
      3, 76, 22, 193'BIRL
1050 DATA 76, 71, 192, 162, 0, 142,
      80, 3, 142, 81, 3'BIRE
1052 DATA 142, 82, 3, 142, 83, 3, 142,
      84, 3, 142, 85'BIVG
1054 DATA 3, 142, 87, 3, 142, 88, 3,
      162, 128, 142, 78'BJBJ
1056 DATA 3, 142, 79, 3, 172, 80, 3,
      177, 65, 45, 78'BHPK
1058 DATA 3, 240, 3, 238, 85, 3, 24,
      173, 80, 3, 105'BHPM
1060 DATA 3, 141, 80, 3, 238, 88, 3,
      173, 88, 3, 201'BHAF
1062 DATA 21, 234, 208, 5, 169, 1,
      141, 87, 3, 238, 84'BJYI
1064 DATA 3, 24, 173, 83, 3, 109, 77,
      3, 141, 83, 3'BGXJ
1066 DATA 201, 21, 16, 5, 240, 3, 76,
      197, 193, 56, 173'BKUM
1068 DATA 83, 3, 233, 21, 141, 83, 3,
      169, 42, 160, 0'BIMN
1070 DATA 56, 200, 237, 77, 3, 144, 3,
      76, 130, 193, 140'BLPH
1072 DATA 86, 3, 173, 84, 3, 160, 0,
      56, 200, 237, 86'BICI
1074 DATA 3, 144, 3, 76, 148, 193,
      140, 86, 3, 173, 85'BJFL
1076 DATA 3, 205, 86, 3, 48, 12, 234,
      234, 172, 81, 3'BIUM
1078 DATA 177, 67, 13, 79, 3, 145, 67,
      24, 173, 81, 3'BIQO
1080 DATA 105, 3, 141, 81, 3, 162, 0,
      142, 84, 3, 142'BIDH
1082 DATA 85, 3, 173, 87, 3, 208, 3,
      76, 56, 193, 169'BIYJ
1084 DATA 0, 141, 88, 3, 141, 87, 3,
      24, 78, 78, 3'BFHL
1086 DATA 78, 79, 3, 144, 21, 169,
      128, 141, 78, 3, 141'BKGO
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1088 DATA 79, 3, 238, 82, 3, 173, 82,
     3, 201, 3, 208'BHAP
1090 DATA 3, 76, 10, 194, 173, 82, 3,
     141, 80, 3, 141'BIQI
1092 DATA 81, 3, 169, 0, 141, 83, 3,
     141, 84, 3, 141'BHPK
1094 DATA 85, 3, 76, 56, 193, 173, 89,
     3, 141, 63, 0'BHOM
1096 DATA 173, 90, 3, 141, 64, 0, 160,
     63, 136, 177, 67'BKVP
1098 DATA 145, 63, 192, 0, 208, 247,
     24, 173, 89, 3, 105'BLXR
1100 DATA 64, 141, 89, 3, 173, 90, 3,
     105, 0, 141, 90'BISA
1102 DATA 3, 206, 66, 3, 206, 77, 3,
     173, 77, 3, 240'BHAC
1104 DATA 16, 162, 63, 169, 0, 157,
     63, 48, 157, 127, 48'BLLF
1106 DATA 202, 208, 247, 76, 0,
     192'BUXE
1200 DATA 162, 21, 169, 0, 157, 135,
     194, 202, 208, 250, 162'BPGD
1202 DATA 21, 169, 0, 157, 157, 194,
     202, 208, 250, 234, 234'BPKF
1204 DATA 234, 234, 234, 169, 255,
     141, 21, 208, 169, 43, 141'BQNH
1206 DATA 132, 3, 162, 0, 169, 43,
     157, 0, 208, 232, 232'BLEI
1208 DATA 24, 105, 43, 224, 16, 208,
     244, 234, 234, 234, 234'BPCL
1210 DATA 234, 234, 234, 234, 234,
     234, 234, 169, 96, 141, 16'BQRE
1212 DATA 208, 169, 160, 141, 14, 208,
     169, 55, 141, 15, 208'BPOG
1214 DATA 169, 128, 141, 23, 208, 141,
     29, 208, 162, 100, 142'BQCI
1216 DATA 134, 3, 162, 10, 142, 135,
     3, 206, 134, 3, 208'BLUJ
1218 DATA 18, 162, 100, 142, 134, 3,
     206, 135, 3, 208, 8'BLBL
1220 DATA 162, 75, 142, 135, 3, 76,
     46, 195, 76, 20, 195'BLJE
1222 DATA 173, 1, 220, 41, 15, 141,
     132, 3, 56, 169, 15'BKDG
1224 DATA 237, 132, 3, 141, 132, 3,
     173, 1, 220, 41, 16'BKRI
1226 DATA 141, 133, 3, 173, 132, 3,
     201, 4, 208, 13, 173'BLTK
1228 DATA 255, 7, 201, 195, 240, 3,
     206, 255, 7, 76, 154'BLWM
1230 DATA 195, 201, 8, 208, 13, 173,
     255, 7, 201, 215, 240'BNJF
1232 DATA 3, 238, 255, 7, 76, 154,
     195, 201, 1, 208, 19'BKAH
1234 DATA 173, 255, 7, 201, 201, 48,
     9, 56, 173, 255, 7'BKBJ
1236 DATA 233, 7, 141, 255, 7, 76,
     154, 195, 201, 2, 208'BLTL
1238 DATA 19, 173, 255, 7, 201, 209,
     16, 9, 24, 173, 255'BLAN
1240 DATA 7, 105, 7, 141, 255, 7, 234,
     234, 234, 173, 133'BMOG
1242 DATA 3, 208, 51, 173, 154, 3,
     240, 3, 76, 215, 195'BKQI
1244 DATA 169, 1, 141, 154, 3, 56,
     173, 255, 7, 233, 195'BLBK
1246 DATA 170, 189, 136, 194, 208, 13,
     169, 1, 157, 136, 194'BPFN
1248 DATA 169, 1, 157, 158, 194, 76,
     215, 195, 169, 0, 157'BNUO
1250 DATA 136, 194, 169, 0, 157, 158,
     194, 76, 215, 195, 169'BPUI
1252 DATA 0, 141, 154, 3, 173, 255, 7,
     201, 194, 208, 46'BLMJ
1254 DATA 173, 1, 220, 41, 15, 141,
     132, 3, 169, 15, 237'BLCL
1256 DATA 132, 3, 240, 18, 201, 4,
     208, 5, 169, 193, 141'BLHN
1258 DATA 255, 7, 201, 8, 208, 5, 169,
     194, 141, 255, 7'BKDP
1260 DATA 173, 1, 220, 41, 16, 208, 3,
     76, 202, 196, 76'BKPI
1262 DATA 222, 195, 76, 20, 195, 196,
     173, 25, 208, 141, 25'BOXL
1264 DATA 208, 41, 1, 240, 118, 174,
     148, 3, 189, 145, 3'BLRM
1266 DATA 162, 0, 157, 1, 208, 232,
     232, 224, 14, 208, 247'BNFO
1268 DATA 162, 0, 173, 150, 3, 157,
     248, 7, 234, 234, 234'BMOQ
1270 DATA 172, 149, 3, 185, 158, 194,
     240, 5, 169, 3, 76'BLNJ
1272 DATA 69, 196, 169, 1, 157, 39,
     208, 56, 173, 255, 7'BLAL
1274 DATA 233, 195, 205, 149, 3, 208,
     9, 169, 191, 157, 248'BOJO
1276 DATA 7, 234, 234, 234, 234, 234,
     234, 234, 234, 234, 234'BQHQ
1278 DATA 200, 238, 150, 3, 140, 149,
     3, 232, 224, 7, 208'BMCR
1280 DATA 191, 238, 148, 3, 173, 148,
     3, 201, 3, 208, 15'BLPK
1282 DATA 169, 0, 141, 148, 3, 169, 0,
     141, 149, 3, 169'BKVM
1284 DATA 195, 141, 150, 3, 174, 148,
     3, 189, 142, 3, 141'BMQO
1286 DATA 18, 208, 104, 168, 104, 170,
     104, 64, 104, 168, 104'BQCR
1288 DATA 170, 104, 64, 255, 255, 255,
     255, 120, 169, 1, 141'BPJT
1290 DATA 26, 208, 173, 17, 208, 41,
     127, 141, 17, 208, 169'BORM
1292 DATA 127, 141, 13, 220, 169, 110,
     141, 18, 208, 169, 16'BPCO
1294 DATA 141, 20, 3, 169, 196, 141,
     21, 3, 88, 76, 181'BKWP
1296 DATA 194, 88, 96, 0, 0, 173, 255,
     7, 201, 194, 208'BKFR
1298 DATA 3, 76, 240, 196, 120, 169,
     240, 141, 26, 208, 169'BOSU
1300 DATA 143, 141, 13, 220, 169, 27,
     141, 17, 208, 169, 49'BOPE
1302 DATA 141, 20, 3, 169, 234, 141,
     21, 3, 88, 96, 169'BKXF
1304 DATA 201, 141, 255, 7, 76, 12,
     196, 0'BAHF
```

END

Dmain

```
5 IF PEEK(679)<>1 THEN POKE 679,1
  :GOTO 10'HOLK
6 GOTO 41'BCME
10 PRINT"[CLEAR]":POKE 53281,2
   :POKE 53280,12:OPEN 2,8,2,"0
   :AILE,S,R"'EYTH
11 PRINT"[DOWN2,RIGHT,YELLOW]
   PLEASE WAIT WHILE THE DATA
   LOADS."'BAEI
20 FOR T=49152 TO 49740:INPUT#2,A
   :POKE T,A:NEXT'GUBF
30 FOR T=49845 TO 50424:INPUT#2,A
   :POKE T,A:NEXT'GUBG
40 CLOSE 2'BBJA
41 POKE 53281,0:POKE 53280,2
   :PRINT"[CLEAR,DOWN2,RIGHT9,CYAN]
   I N T R O D U C I N G"'DQEM
42 PRINT"[DOWN2,RIGHT11,RVS,GREEN,
   SHFT M,CMDR P15,SHFT N]"'BAXQ
43 PRINT"[RVS,RIGHT11,CMDR M,WHITE]
   >>>> DMAIN <<<<[GREEN,CMDR G]"'BAXJ
44 PRINT"[RVS,RIGHT11,SHFT N,CMDR Y15,
   SHFT M]"'BADS
45 PRINT"[DOWN3,RIGHT4,L. BLUE]AUTHOR
   [WHITE].......[PURPLE]
   DAVID J. STEPHENS"'BAFP
46 PRINT"[L. BLUE,DOWN,RIGHT4]
   DATE COMP[WHITE]....[PURPLE]
   6/2/85"'BAVM
47 PRINT"[DOWN5,YELLOW]
   FOR USE WITH REGULAR COLOR MODE
   SPRITES.":GOTO 99'CDSU
48 GET A$:IF A$=""THEN GOTO 48'FHAM
49 PRINT"[CLEAR]":POKE 53280,14
   :POKE 53281,0:POKE 49741,96
   :POKE 50372,206:DIM H(21)'GRKV
50 FOR T=49800 TO 49843:POKE T,0
   :NEXT'FQUH
55 FOR T=0 TO 2:READ A,B:POKE 910+T,A
   :POKE 913+T,B:NEXT'JWEQ
60 FOR T=0 TO 62:READ A:POKE T+12288,A
   :POKE T+12352,0:POKE T+12416,0
   :NEXT'LJTQ
61 FOR T=0 TO 62:READ A:POKE T+13888,A
   :NEXT'HQAK
62 FOR T=0 TO 62:READ A:POKE T+13952,A
   :NEXT:GOTO 130'IUYN
99 PRINT"[DOWN,RIGHT7,L. GREEN,RVS]
    PRESS ANY KEY TO BEGIN ! "
   :GOTO 48'CDAX
130 PRINT"[CLEAR]":V=53248:POKE V+21,7
    :POKE 2040,192:POKE 2041,193
    :POKE 2042,194'HPVL
140 POKE V,75:POKE V+1,110
    :POKE V+2,150:POKE V+3,110
    :POKE V+4,225:POKE V+5,110'LOOO
150 POKE 828,0:POKE 829,48:POKE 830,64
    :POKE 831,48:POKE 832,128
    :POKE 833,48'GQCL
160 POKE 834,24:POKE 845,21:POKE 842,0
    :POKE 857,192:POKE 858,48'FJWK
170 FOR T=55306 TO 55310:POKE T,1:NEXT
    :'FRNI
175 PRINT"[CLEAR,DOWN14,RIGHT3,ORANGE,
    RVS] NOW DERESING SPRITE. PLEASE
    WAIT."'BAQT
180 POKE V+23,7:POKE V+29,7
    :POKE V+39,1:POKE V+40,6
    :POKE V+41,2:SYS 49152'LKJR
185 POKE V+21,0'CFKK
190 FOR T=0 TO 62:POKE T+12352,
    PEEK(T+13888):POKE T+12224,
    255'JGFQ
191 POKE 12416+T,PEEK(T+13952)
    :NEXT'FQSL
200 PRINT"[CLEAR]":POKE 53281,0
    :POKE 2047,195:POKE 916,0
    :POKE 917,0:POKE 918,195'GMIH
201 POKE V+43,7:PRINT"[DOWN21,RIGHT3,
    YELLOW,RVS] SELECT SPRITES! "'DGZH
210 POKE 53280,14:POKE V+46,5
    :SYS 50336:N=2'FXLF
215 PRINT"[CLEAR]"'BATD
220 POKE V+21,0:POKE 53281,0
    :POKE 53280,7:PRINT"[DOWN2,RIGHT7,
    CYAN]THE MENU?"'FWCJ
230 PRINT"[RIGHT6,DOWN3,WHITE]#1
    : CHOOSE SPRITES!"'BALF
240 PRINT"[RIGHT6,DOWN2,WHITE]#2
    : EXAMINE ANIMATION!"'BAFH
250 PRINT"[RIGHT6,DOWN2,WHITE]#3
    : SAVE DATA TO DISK!"'BAFH
260 PRINT"[RIGHT6,DOWN2,WHITE]#4
    : TERMINATE THE PROGRAM!"'BAMK
270 PRINT"[DOWN4,RIGHT2,CYAN,RVS]
     INPUT THE NUMBER OF YOUR CHOICE.
    ":PRINT:G=1'DEQP
280 J=PEEK(56321):FR=J AND 16
    :J=15-(J AND 15):'HYLO
290 IF J=1 THEN N=N-1:POKE
    1024+((N+1)*120)+160+4,32
    :IF N=0 THEN N=1'PGGV
300 IF J=2 THEN N=N+1:POKE
    1024+((N-1)*120)+160+4,32
    :IF N=5 THEN N=4'PGPN
305 IF FR=16 THEN G=0'EGMG
306 IF FR=0 AND G=0 THEN GOTO 320'GILI
310 POKE 1024+(N*120)+160+4,107'FSAE
311 POKE 55296+(N*120)+160+4,10'FSNF
315 GOTO 280'BDJE
320 ON-1*(N=1)-2*(N=2)-3*(N=3)-4*(N=4)
    GOTO 330,400,500,321'OKNP
321 POKE 680,0:SYS 680'CJHD
330 PRINT"[CLEAR]":GOTO 190'CEMC
400 PRINT"[CLEAR]":POKE V,150
    :POKE V+1,150:N=0:POKE V+23,1
    :POKE V+29,1'JDLK
410 POKE 53280,2:FOR T=21 TO 0 STEP-1
    :IF PEEK(49800+T)=1 THEN
    H(N)=195+T:N=N+1:J=1'QNQR
420 NEXT:TE=0:W=1:C=0:POKE V+21,1
    :IF N=0 OR N=1 THEN N=1
    :GOTO 215'NCNO
421 PRINT"[CLEAR,DOWN,RIGHT12,WHITE]
    SPRITE ANIMATION"'BASI
422 PRINT"[L. BLUE,DOWN3]
     MOVE JOYSTICK TO THE LEFT TO
    SLOW. "'BANM
423 PRINT"[RIGHT]MOVE JOYSTICK TO THE
    RIGHT TO SPEED UP."
    :POKE V+39,5'DGCQ
424 PRINT"[RIGHT,YELLOW,RVS]
     PRESS FIRE BUTTON TO RETURN TO
    MENU. "'BAGP
430 POKE 2040,H(C):C=C+W
    :IF C=N-1 THEN W=-1'JTVL
440 IF C=-1 THEN C=0:W=1'GHFH
450 FOR T=0 TO TE:NEXT'EFAG
460 JV=PEEK(56321):FR=JV AND 16
    :JV=15-(JV AND 15)'HCQP
470 IF JV=4 THEN TE=TE+5
    :IF TE=2005 THEN TE=2000'JVGQ
471 IF JV=8 THEN TE=TE-5
    :IF TE=-5 THEN TE=0'KPUQ
472 IF FR=16 THEN J=0'EGPL
475 IF FR=0 AND J=0 THEN N=3
    :GOTO 215'HLVR
480 GOTO 430'BDGH
500 PRINT"[CLEAR]":YI=0
    :FOR T=21 TO 0 STEP-1
    :IF PEEK(49800+T)=1 THEN
    H(N)=195+T:YI=YI+1'QJOS
501 NEXT:IF YI=0 OR YI=1 THEN N=1
    :GOTO 215'INAI
502 PRINT"[RIGHT9,DOWN,YELLOW]
    SAVE SPRITES TO DISK"'BAEI
503 PRINT"[RVS,RED,DOWN,RIGHT2]
    PLEASE REMOVE JOYSTICK FROM
    PORT!!"'BAEM
504 PRINT"[GREEN,DOWN2,RIGHT7]
    WHEN THIS IS DONE TYPE '/'"'BARL
505 GET A$:IF A$<>"/"THEN GOTO
    505'GIQJ
506 PRINT"[CYAN,DOWN]IF YOU REACHED
    THIS STEP IN ERROR TYPE *"'BABQ
510 INPUT"[DOWN2,RIGHT]
    NAME OF THE SPRITE?";N$'BDQG
520 IF N$="*"THEN N=2:GOTO 215'FIOG
530 OPEN 2,8,2,"0:"+CHR$(191)+N$+CHR$
    (191)+",S,W"'HSBL
540 FOR T=0 TO 20'DENF
545 IF PEEK(T+49800)=1 THEN GOTO
    550'GMCO
546 NEXT:PRINT#2,-1:CLOSE 2
    :GOTO 575'FKDN
550 R=(T+195)*64:FOR Y=R TO R+63
    :PRINT#2,PEEK(Y):NEXT'KWDP
560 GOTO 546'BDOG
575 PRINT"[CYAN] RE-INSERT
    JOYSTICK."'BASR
576 PRINT"[GREEN,SPACE3,RVS]
     PRESS ANY KEY TO RETURN TO MENU.
    "'BAQW
578 GET A$:IF A$=""THEN GOTO 578'FIGS
580 N=4:GOTO 215'CGRJ
1000 DATA 90,110,140,160,180,200
     :REM SCAN LINES'CHAB
1005 DATA 128,0,1,192,0,3,160,0,5,144,
     0,9,136,0,17,132,0,33,130'BDII
1010 DATA 0,65,130,60,65,154,102,89,
     166,195,101,161,129'BUAD
1015 DATA 133,161,195,133,166,231,101,
     154,90,89'BMWG
1020 DATA 130,60,65,132,0,33,136,0,17,
     144,0,9,160,0,5,192,0,3,128,0,
     1'BJYG
1050 DATA 198,127,255,238,64,1,254,64,
     1,214,64,1,198,126,1,198,2'BEAI
1051 DATA 1,3,242,1,243,2,1,147,242,1,
     147,3,241,147,240,17,144,25,
     145'BJTK
1052 DATA 159,157,145,128,159,145,128,
     155,159,128,153,128,128,128,198,
     128'BNPM
1053 DATA 252,198,128,4,198,128,4,198,
     255,252,254'BOOJ
1060 DATA 254,127,255,192,64,1,254,64,
     1,6,64,1,134,126,1,254,2,1,3,242,
     1'BMSL
1061 DATA 240,194,1,144,195,241,144,
     192,17,144,192,17,144,15,17,159,
     153,145'BPWN
1063 DATA 128,159,145,128,153,159,128,
     153,128,128,128,130,128,252,
     198'BJBO
1064 DATA 128,4,124,128,4,16,255,252,
     16'BEBJ
```

END

Ddisk

```
1 L=1000'BFPA
10 PRINT"[CLEAR]":POKE 53281,0
   :POKE 53280,6:POKE 829,0'EWWE
15 FOR T=830 TO 1000:POKE T,154
   :NEXT'FPUI
20 PRINT"[DOWN3,YELLOW,SPACE9]
   NOW LOADING DISK MENU"'BADG
40 OPEN 1,8,0,"$:[CMDR B]*":U=0
   :A=49152'DQTG
50 GET#1,X$,X$'BISD
60 GET#1,X$,X$,X$,X$'BOXF
70 IF ST THEN CLOSE 1:PRINT"[CLEAR]"
   :GOTO 104'FIEI
80 GET#1,X$:IF X$=""THEN POKE A,0
   :A=A+1:U=0:GOTO 60'JVCO
85 IF X$=CHR$(191)THEN U=U+1
   :GOTO 100'HOHQ
90 IF U=1 THEN POKE A,ASC(X$)
   :A=A+1'HMXM
100 GOTO 80'BCPU
104 IF J$=""THEN DIM A$(200)'EJGD
105 PRINT"[RIGHT10,GREEN,RVS]>>>>
    [WHITE] DDISK MENU [GREEN]<<<<
    [DOWN]":FOR T=0 TO 500:NEXT:AS=L
    :LK=A'HPUO
106 A$(0)=" NOTHING":J$=A$(0):P=1
    :IF A=49154 THEN GOTO 310'HBGN
107 W=1:FOR T=49153 TO A
    :IF P=1 THEN P=0:A$(W)=""'JVAM
```

```
108 IF PEEK(T)<>0 THEN
    A$(W)=A$(W)+CHR$(PEEK(T))'JTIN
110 IF PEEK(T)=0 THEN W=W+1:P=1'HKJD
115 NEXT:T=1:L=1'DGQE
116 PRINT"[CLEAR,DOWN2,CYAN]
    LAST CHOICE WAS #"PEEK(829)"
    : "A$(PEEK(829))'DOXM
117 PRINT CHR$(PEEK(829+T))"[RIGHT2]
    FILE #"T" : "A$(T)'EOXK
118 T=T+1:L=L+1'EHWI
119 IF T=W-1 OR L>15 THEN GOTO
    121'HJEL
120 GOTO 117'BDIX
121 PRINT"[RIGHT2,WHITE]CHOOSE 0
    [SPACE2]: END SESSION!"'BAIE
122 PRINT"[RIGHT2,WHITE]CHOOSE -1
    : CONTINUE LISTING!"'BAEH
123 PRINT"[RIGHT2,WHITE]CHOOSE -2
    : INSERT NEW DISK!"'BARH
130 INPUT"[ORANGE] FILE NUMBER";A
    :IF A<-2 OR A>T-1 THEN PRINT"[UP2]
    ":GOTO 130'KMQL
131 IF A=0 THEN GOTO 500'EFOC
132 IF A=-1 AND T=W-1 THEN L=1:T=1
    :GOTO 116'KOCJ
133 IF A=-1 THEN L=1:GOTO 116'GING
134 IF A=-2 THEN GOTO 330'FFHG
135 POKE 829,A:POKE 829+A,156'DOFH
136 I=0:OPEN 2,8,2,"0:"+CHR$(191)+A$
    (A)+CHR$(191)+",S,R":Q=1:L=AS'KGHS
140 INPUT#2,D:IF D=-1 THEN CLOSE 2
    :GOTO 150'HLRF
145 POKE 35000+I,D:I=I+1:GOTO 140'FQMK
150 PRINT"[CLEAR,YELLOW]":PRINT
    :PRINT'DCND
155 IF Q=1 THEN PRINT L"REM SPRITE
    "A$(A)" DATA":H=1:T=0:L=L+2'ISJS
160 H=H+1:IF H=9 THEN GOTO 200'GJOG
165 PRINT L"DATA";:Y=0'CFDJ
170 PRINT PEEK(35000+T)"[LEFT],";
    :T=T+1'FNXJ
180 IF T=I THEN PRINT"[LEFT] ":P=1
    :GOTO 200'GJDJ
190 Y=Y+1:IF Y=12 THEN L=L+2
    :PRINT"[LEFT] ":GOTO 160'JPQO
195 GOTO 170'BDHK
200 IF P=1 THEN P=0:PRINT"L="L+2"
    :A="LK":GOTO104":PRINT"[HOME]"
    :H=H+1:GOTO 210'KSSK
201 PRINT"L="L":T="T":I="I":LK="LK"
    :GOTO150":PRINT"[HOME]"'CGLF
210 FOR T=631 TO 631+(H-1):POKE T,13
    :NEXT:POKE 198,H:END'JYSH
310 PRINT"NO FILES WERE FOUND. PLEASE
    INSERT[SPACE6]ANOTHER DISK."'BAOM
330 PRINT"PRESS ANY KEY WHEN THE NEW
    DISK IS IN[SPACE3]PLACE."
    :L=AS'CEBO
340 GET D$:IF D$=""THEN GOTO 340'FIYF
350 GOTO 10'BCIC
500 PRINT"YOU MAY NOW SAVE THE
    PROGRAM.":POKE 43,34
    :POKE 44,14'DMUL
```

END

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BY IAN ADAM

128 Escape Sequences

Advanced Screen Editing

A new feature included with the Commodore 128 is the escape key. This key is used with other keys to generate escape sequences for screen editing and similar functions. These sequences can be typed in at the keyboard or accessed under program control, and allow you to escape from many of the time-consuming chores of using the screen.

To use escape sequences, first press and release the escape key at the upper left corner of the keyboard, then press the appropriate letter. The desired function is carried out immediately, and no characters are displayed on the screen. You can experiment with these sequences as you read along, in order to get familiar with them.

You can also access escape sequences under program control. Simply use the command PRINT CHR$(27) "A" or whatever letter is required. The escape key has the ASCII code 27, and there are a total of 27 sequences, so it should all be easy to remember. The available effects include setting up windows, clearing portions of the screen, moving the cursor, scrolling, and so on. While you will not need to use all of these sequences regularly, you will likely find that a few of them will become favorites, speeding your use of the screen.

Switching Screens

One of the most important escape applications is escape-X, which switches between 40- and 80-column modes. If you are typing away and the cursor suddenly disappears from the screen, it is likely that you inadvertently pressed escape-X. Simply switch your monitor over to the other screen, or else press escape-X again to bring the cursor back.

Most of the escape sequences will work in either mode. However, there are some exceptions to this rule, which work only on the 80-column screen, so let's take a look at them first. Escape-R will put the 80-column screen into reverse video. Unlike control-9, which causes current text to be printed in reverse on either screen, this command flips the whole 80-column screen into reverse. Escape-N cancels this command. Escape-U converts the cursor to an underline, typical of many 80-column business computers. Escape-S restores the block cursor. The 40-column screen cannot access the underline cursor, although it uses all the other sequences.

Cursor Controls

While the 40-column cursor cannot be set to an underline, its mode can still be altered. Escape-E will convert the cursor to a solid block, instead of flashing. Escape-F will bring back the flash.

Several other sequences assist in controlling the cursor's position on the screen and are particularly handy during program-development sessions. Escape-K moves to the end of text on the current line, and is great for appending instructions to an existing program line. Escape-J moves back to the start of the current line. These are particularly useful on the 80-column screen, where horizontal cursor movement can sometimes take a while.

The TAB key is another fast way of motoring about the screen. When the computer is first powered up, the tab stops are set every eight spaces, so a few presses will move you quickly across the screen. If you prefer to set your own, escape-Z will clear all tab stops, so you can start with a clean slate. Then move the cursor to a convenient location for a tab stop, and press SHIFT-TAB. (The same command will remove an existing tab). Once you get them set right, then TAB will move the cursor directly to the columns you selected. This is handy for editing, for building tables of data, or just for jumping to the right side of the screen quickly. When you are finished, escape-Y will reestablish the default tab stops.

Screen Modes

The 128 includes both a new cure for an old inconvenience and a new screen mode. On both the 128 and 64, you can enter quote mode by typing a quotation mark (") or enter insert mode by pressing the INST key one or more times. But in these modes, the cursor, color, and other keys behave differently. One problem with the 64 is that it can sometimes be awkward to get out of these modes, and several equally awkward "fixes" have been published. With the 128, this problem is cured. A simple escape-O cancels both of these modes.

The new screen mode is automatic insert. Say you want to insert a dozen or so characters into a line. Instead of pressing the INST key 12 or more times, just press escape-A once. As you type, all characters to the right are automatically shifted over to make room. When you're finished, type escape-C to cancel. (Note that escape-C and escape-O are reversed in the system guide).

Screen Manipulation

Nine of the escape sequences affect the contents of the screen, by either moving data or erasing it. Four of these affect scrolling: Escape-V scrolls the whole screen up one line, while escape-W scrolls down, a new feature. Escape-M will disable normal scrolling and escape-L restores it.

Normally, when you move the cursor off the bottom of the screen or print off the bottom, the screen scrolls up to make room. However,

128 USERS ONLY/ESCAPE KEYS

> *Escape-V converts the cursor to an underline, typical of many 80-column business computers. Escape-S restores the block cursor.*

after you press escape-M, when you reach the bottom of the screen, the cursor simply jumps directly from the bottom line back to the top, and the screen contents remain fixed. This is helpful is you're building a screenful of graphics or data, since you can't lose some of the data by accidentally scrolling it off the top. If you do want to scroll the screen, escape-V and escape-W still work.

Three sequences erase portions of the screen. Escape-Q erases from the current cursor position to the end of the logical line. This can be very useful when you have edited a program line and want to remove unwanted instructions from the end. If several screen lines are linked into one logical line, they will all be affected. In the same way, escape-P erases from the cursor to the start of the line. Escape-@ erases to the bottom of the screen. In all three cases, the character under the cursor is erased.

Escape-D will delete the complete line that the cursor is on, and everything below it on the screen will be moved up to fill the space. Again, several screen lines linked together will all be deleted. Escape-I allows a blank line to elbow its way onto the screen, pushing everything below it down a line.

Windows

In real life, the potential of a window is limited only by what's there on the other side waiting to be viewed. The metaphor holds true on the 128, where windows are a major new feature that could easily be the subject of several articles.

The escape codes for all this power are very simple. Position the cursor at what will be the top left corner of the desired window, and press escape-T. Move the cursor to what will be the bottom right corner, and press escape-B. That's all it takes to define a window. Once a window is defined, all screen activities, such as printing, cursor moves, and scrolling, will affect only the area within the window. There are numerous applications for this—giving instructions in a program, reviewing two parts of a listing at once, or whatever. (For a chuckle, try defining a very small window, say 2 columns by 5 rows, then list a program!) From within a BASIC program, it is better to use the WINDOW command directly, instead of escape codes. In either case, you cancel the window by pressing (or, from within a program, printing) HOME twice.

Saved by the Bell

Let's wrap up the discussion of escape codes with the bell—hold down the control key and press G to hear it. PRINT CHR$(7) has the same effect from within a program, and is a handy way of getting the user's attention without all the details of setting up a proper musical note. Escape-H will silence the bell, if you're getting tired of hearing it, while escape-G will reenable it.

Keep Them in Mind

With this many different sequences, it takes a little practice to remember which code is which. Table 1 lists all the codes, grouped in

Table 1. Escape Codes
There are 27 escape codes, all accessed with CHR$(27)

	SEQUENCE	MNEMONIC	FUNCTION
80 Columns	escape X	Exchange	switch 40/80 column screens
	escape R	Reverse	reverse video
	escape N	Normal	normal video
	escape U	Underline	underline cursor
	escape S	Standard	normal cursor
Cursor Controls	escape E	(Empty?)	non-flashing cursor
	escape F	Flash	flashing cursor
	escape J	Jumpstart	cursor to start of current line
	escape K	Kickover	cursor to end of current line
	escape Z	Zero tabs	clear all tabs
	escape Y		reset default tabs (8 spaces)
	escape O	Out of quotes	cancel quote & insert mode
	escape A	Auto	start auto-insert mode
	escape C	Cancel auto	end of auto-insert mode
Screen Manipulation	escape V	Vertical	scroll screen up
	escape W	Wind down	scroll screen down
	escape M		disable normal scrolling
	escape L	scroll	resume normal scrolling
	escape Q	Quit this line	erase to end of line
	escape P		erase to start of line
	escape @		erase to end of screen
	escape D	Delete line	delete logical line
	escape I	Insert line	insert blank line
Windows	escape T	Top	set top and
	escape B	Bottom	. . .bottom of window at cursor
Bell	escape G	ctrl-G = bell	enable bell
	escape H	Halt the bell	disable bell

logical pairs, along with a few mnemonics. Some form of word association, even if a little bit silly, can make it easier to keep the codes straight. In some cases, the letters naturally related to the functions; in other cases, the sequences just got left-over letters. You can try to think up the missing mnemonics if you want; otherwise, just keep a copy of the table handy next to the computer.

The Program

Remember that escape sequences can be used from within a program. Aside from their obvious direct uses in your code, they can also be placed within loops to achieve some very interesting effects. The accompanying program illustrates how escape codes can be applied to one small task, clearing the screen. Programs often have menus or instructions that must be cleared before proceeding. While this can be achieved easily by using SCNCLR, the program shows nine ways of clearing the screen that can add a novel touch to your programs. Don't be fooled by the length of the program—each effect requires only one subroutine, typically three lines. The escape sequences operate quite fast, so some of the routines have delay loops to enhance the effect.

Type the program in, save it and then run it. It will work in either 40-column or 80-column mode, as you specify. The screen then fills with text so that you can see the effects better. Press a number key from 1 to 9 and observe the result. When it's finished, press any key to get the menu back, or STOP to end the program.

Notice that it is useful to define a variable as the escape character, and here we set E$ = CHR$(27) in the first line. You can use this same method to send commands to your printer, if it's of a type that uses escape codes. For example, OPEN 4,4:PRINT#4, E$ + CHR(64) will reset many printers. ■

Before typing these programs, read "How to Enter Programs," and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Escape

```
100 E$=CHR$(27)'CGFW
110 COLOR 0,1'BDPW
120 INPUT"[CLEAR]IS THIS 40 OR 80
    COLUMNS";SC'BDEE
130 SC=SC-1'CFKA
140 IF SC=39 THEN K=1'EGUD
150 IF SC=79 THEN K=31'EHYE
160 IF K=0 THEN RUN'ECHD
170 DO'BAJC
180 :'ABHD
190 PRINT"[HOME2]"'BAPE
200 PRINT"[DOWN]128 ESCAPE CODES"'BACA
210 PRINT"[DOWN]SCREEN CLEAR
    ROUTINES"'BAGD
220 PRINT"[DOWN]BY IAN ADAM 1986"'BAQC
230 PRINT"[DOWN2]1 SCROLL UP"'BASC
240 PRINT"2 SCROLL DOWN"'BADE
250 PRINT"3 ERASE UP"'BAPE
260 PRINT"4 ERASE DOWN"'BAPF
270 PRINT"5 FROM RIGHT"'BABG
280 PRINT"6 FROM LEFT"'BASH
290 PRINT"7 FROM CENTER OUT"'BARK
300 PRINT"8 INTO MID-SCREEN"'BAHC
310 PRINT"9 DISSOLVE"'BAYB
320 PRINT"[DOWN2]PRESS A CHOICE-"'BAXD
330 PRINT"[DOWN]ANY KEY TO
    RETURN"'BAHF
340 :'ABHB
350 FOR I=0 TO 24'DEGE
360 COLOR 5,(I AND 7)+4'DHPG
370 CHAR,22+(I AND K),I,
    "128 ESCAPE CODES"'DKLM
380 NEXT'BAEF
390 :'ABHG
400 GET KEY A$'CCEY
410 ON VAL(A$) GOSUB 500,600,700,800,
    900,1000,1100,1200,1300'DSUI
420 GET KEY A$'CCEB
430 LOOP'BAKB
440 :'ABHC
500 FOR I=0 TO 24'DEGB
510 PRINT E$"V";'BDWB
520 NEXT:RETURN'CBXC
530 :'ABHC
600 FOR I=0 TO 24'DEGC
610 PRINT E$"W";'BDXC
620 NEXT:RETURN'CBXD
630 :'ABHD
700 FOR I=24 TO 0 STEP -1'FFIF
710 CHAR,0,I,E$+"Q"'CHPF
720 FOR J=1 TO 20 :NEXT'EFLG
730 NEXT:RETURN'CBXF
740 :'ABHF
800 FOR I=0 TO 24'DEGE
810 CHAR,0,I,E$+"Q"'CHPG
820 FOR J=1 TO 20 :NEXT'EFLH
830 NEXT:RETURN'CBXG
840 :'ABHG
900 FOR I=SC TO 0 STEP -1'FFGH
910 WINDOW I,0,I,24,1'BLHH
920 FOR J=1 TO 10 :NEXT'EFKI
930 NEXT:RETURN'CBXH
940 :'ABHH
1000 FOR I=0 TO SC'DEEU
1010 WINDOW I,0,I,24,1'BLHW
1020 FOR J=1 TO 10 :NEXT'EFKX
1030 NEXT:RETURN'CBXW
1040 :'ABHW
1100 FOR I=12 TO 0 STEP -1'FFFX
1110 WINDOW I,I,SC-I,24-I,1'DOKA
1120 FOR J=1 TO 30 :NEXT'EFMY
1130 NEXT:RETURN'CBXX
1140 :'ABHX
1200 CHAR ,0,12'BFCV
1210 FOR I=0 TO 12'DEDX
1220 PRINT E$"D"E$"W"E$"D";'BHPY
1230 NEXT:RETURN'CBXY
1240 :'ABHY
1300 FOR I=6 TO 30 STEP 7'EFCY
1310 IF I>24 THEN I=I-25'FHGB
1320 CHAR,0,I,E$+"Q"'CHPB
1330 FOR J=1 TO 10 :NEXT'EFKC
1340 NEXT:RETURN'CBXB
```

END

BY MORTON A. KEVELSON

Saving and Loading the Commodore 128 Graphic Bit Map

Save graphics to disk as binary program files, and they'll load fast and take up very little programming space.

Among the many features of BASIC 7.0 on the Commodore 128 are the built-in graphic commands. These support the creation of bit-mapped images in both the high-resolution (GRAPHIC 1) and multicolor (GRAPHIC 3) display modes of the 40-column VIC chip.

However, as with all other eight-bit machines running at one or two megahertz, drawing a complex image can take some time. The programming overhead can also become extensive since each drawing step must be specified by a BASIC command. As a result, program size may be prohibitive for applications which have multiple graphic screens.

These restrictions can be avoided if the finished images are saved to disk as binary program files. Then only a few short BASIC 7.0 commands are needed to redisplay the images. Program overhead is also reduced, because all that is required are the image file names, and even these may be saved in a disk file. In addition, when you use a 1571 disk drive, the time to bring up an image is minimal. It takes only about four seconds to load a high-resolution bit map and less than six seconds for a multicolor image. With this kind of speed, graphically oriented programming becomes quite comfortable in real time.

An additional benefit of working directly with the Commodore 128's graphic bit map is the ability to import images from existing Commodore 64 applications. There are many excellent graphic packages for the 64 which have seen extensive use in the Commodore community. Numerous collections of bit-mapped images exist in the public domain. Once the format of these files is known, it becomes a simple matter to convert them using BASIC 7.0's BSAVE and BLOAD commands or the 128's built-in machine-language monitor. A few file formats (*Doodle!* from City Software is an excellent example) are in a directly usable format.

Saving and loading the high-resolution bit map is straightforward. When the GRAPHIC 1 command is first used, a nine kilobyte area at the start of BASIC program space in bank 0 is allocated. Any BASIC program in memory at the time (initially at 7168/$1C00) is automatically moved to the new start of BASIC at 16384/$4000. This allocation is permanent, even if the text display is turned back on with a GRAPHIC 0 command. The GRAPHIC CLR command or a system reset is required to move the start of BASIC text back to 7168. Thus, all that is needed to put a complete high resolution image on disk is to:

```
BSAVE "image name",B0,P7168 TO
P16191
```

This image can be redisplayed by setting high-resolution graphic mode (GRAPHIC 1) and:

```
BLOAD "image name",B0,P7168
```

Saving and loading a multicolor bit-mapped image is a bit tricky. Although the multicolor mode has half the horizontal resolution of the high-resolution mode (160 pixels versus 320 pixels), it has nearly twice the color capability. The extra color information is stored in 1,000 nybbles starting at 55296/$D800. There is also an essential screen background color in the lower nybble at 53281/$D021. Thus, we must save these 1,001 nybbles as well as the original bit map and color information men-

Variable Passing to BASIC 7.0 DOS Commands

Part of BASIC 7.0's command repertoire on the Commodore 128 are the DOS commands, which let you access the power of your disk drive without having to open a separate command channel. The format of the commands in 7.0 makes parameter specification somewhat easier than it is with the direct DOS commands used by BASIC 2.0.

The *Commodore 128 Personal Computer System Guide* does a thorough job of presenting the DOS commands. However, through some oversight, the specific method of passing parameters to these DOS commands is not clearly specified. This has left many C128 programmers in the dark about how to reassign DOS command parameters under program control.

The difficulty stems from the structure of the BASIC 7.0 DOS command. For example:

```
BSAVE "filename"[,Ddrive number][,Udevice number] [,Bbank
number],Pstart address TO Pend
address
```

All uppercase characters are part of the command syntax and must be entered as shown. Parameter descriptions are in lowercase, and optional parameters are enclosed by square brackets.

The manual does indicate that the "filename" can be replaced by a string variable if the variable name is enclosed in parentheses. It turns out that all the parameters may be treated in the same way. Thus, the following series of BASIC 7.0 statements would be valid:

```
FN$="BIT MAP"
DN=0
DV=8
BN=0
SA=7168
EA=16383
BSAVE(FN$),D(DN),U(DV),
B(BN),P(SA) TO P(EA)
```

The last of the above statements will work without generating a syntax error!

The need for the parentheses becomes obvious if we examine one of the numeric terms. Writing DDN would result in BASIC looking for variable DD.

tioned above.

This would normally not be a problem with the 128. All this data is in the I/O block accessed with bank 15. However, the 128 actually has two one-kilobyte banks of color nybbles. Both of these share the address space at $D800. This allows the 128 to maintain completely independent text and graphic screens. It is therefore possible to update the text screen while the graphic screen is displayed, and vice versa. Neither screen will be affected by what is displayed on the other. (Actually the 128 has three completely independent display screens if the 80-column mode is considered, as well.)

The operating system and BASIC 7.0 keep careful track as to what information goes where. In doing this, both the VIC chip and the microprocessor have to be told where to get their data and where to put the data for each display mode.

The register which does all this is the I/O port on the microprocessor at address 1. Bit 0 of this port directs the attention of the microprocessor. When it is turned on, the microprocessor will read or write the text's color memory. When it is turned off, the processor works the bit-map display's color memory. This bit must be set accordingly when loading or saving the color memory.

The problem is that trying to change location 1 with a simple POKE command is an exercise in futility. The operating system updates this port every sixtieth of a second in response to an IRQ generated by the VIC chip's raster scan register. This causes the BSAVE and BLOAD commands to default to text color memory. Any attempts to change this are negated before we can get much done. The solution is to turn off the raster scan interrupt, at 53266/$D012, before setting location 1.

The accompanying programs perform all the needed activities for both saving and loading the graphic displays. They have been written as subroutines which may be appended to your own programs. The save subroutine expects the display to be in either the appropriate graphic mode or split-screen mode when it is called. The screen is restored to this mode when you exit the subroutine. If an attempt is made to enter while in text display, execution is simply returned to the calling program.

The save routine checks for the current graphic mode and prompts for an image file name in which to save the bit map. For a high-resolution image, the bit map and screen memory are saved as a single file. For a multicolor image, the same block of memory is saved along with a separate file containing the color memory from $D800. The suffix ".CM" is appended to the color memory file name. The file name will be truncated to 13 characters, if necessary, to accommodate this.

I have also made use of some of the extra bytes between the screen memory and the bit map. The screen border color is stored in 8168. The background color is in 8169. I saved the graphic display mode in 8170 for use by the loader subroutine.

The loader subroutine initially assumes a high-resolution display. After the screen memory and bit map are loaded, it checks location 8170 and switches modes if necessary. The color memory will then be loaded. Note that the values saved for the background and border colors are the actual VIC chip values. These are incremented by one for use by BASIC 7.0.

When converting Commodore 64 bit maps to this format, keep in mind that not all packages save the background and border colors. Some assume a background color of white or black. Modify the saved files or the loader routine accordingly. ■

Before typing these programs, read "How to Enter Programs," and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Save Subroutine

```
10000 MO=RGR(X)'CFTS
10010 ON MO GOTO 10040,10030,10040,
      10030'CAMX
10020 RETURN'BAQS
10030 M1=MO-1:GOTO 10045'DLAX
10040 M1=MO'BEDV
10045 GRAPHIC 0'BBOB
10060 INPUT"IMAGE SAVE NAME";NM$'BEBC
10070 GRAPHIC M1'BCQY
10080 BANK 15:A=PEEK(53280) AND 15'EONE
10090 B=PEEK(53281) AND 15'DKFE
10100 BANK 0:POKE 8168,A:POKE 8169,B
      :POKE 8170,M1'EYQY
10110 BSAVE (NM$),B0,P7168 TO
      P16383'CVHY
10120 IF MO<3 THEN GRAPHIC MO
      :RETURN'FGUX
10130 BANK 15'BDBV
10140 POKE(53274),PEEK(53274) AND
      254'DSWB
10150 POKE 1,PEEK(1)AND 254'DIEA
10160 IF LEN(NM$)>13 THEN
      NM$=LEFT$(NM$,13)'GSRF
10170 NM$=NM$+".CM"'CGEC
10180 BSAVE (NM$),B15,P55296 TO
      P56319'CXQA
10190 POKE 1,PEEK(1) OR 1'DGZE
10200 POKE(53274).PEEK(53274) OR 1'DQSX
10210 GRAPHIC MO:RETURN'CDPV
```

END

Loader Subroutine

```
10000 INPUT"GRAPHIC NAME";NM$'BEAU
10010 GRAPHIC 1,1'BDHS
10020 BLOAD(NM$),B0,P7168'BPPW
10030 A=PEEK(8168)+1:B=PEEK(8169)+1
      :M1=PEEK(8170)'IBXE
10040 COLOR 4,A:IF M1=1 THEN
      RETURN'FHBY
10050 GRAPHIC 3:COLOR 0,B'CFHX
10060 IF LEN(NM$)>13 THEN
      NM$=LEFT$(NM$,13)'GSRE
10070 NM$=NM$+".CM"'CGEB
10080 BANK 15'BDBA
10090 POKE 53274,PEEK(53274) AND
      254'DQQF
10100 POKE 1,PEEK(1) AND 254'DIEU
10110 BLOAD(NM$),B15,P55296'BRVW
10120 POKE 1,PEEK(1)OR 1'DGZW
10130 POKE 53274,PEEK(53274) OR 1'DORY
10140 BANK 0:B=(PEEK(8169)AND 15)+1'FPMC
10150 RETURN'BAQW
```

END

USER GROUPS

Although there are almost 1000 known Commodore user groups nationwide and around the world, this list includes only those that have been officially recognized by Commodore as Approved User Groups. If your group would like to apply for Approved status, contact Pete Baczor, User Group Coordinator, at Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380.

Commodore user groups provide invaluable assistance to Commodore computerists. If you are looking for people who share your computing interests, or if you need help getting started with your computer, contact the group near you.

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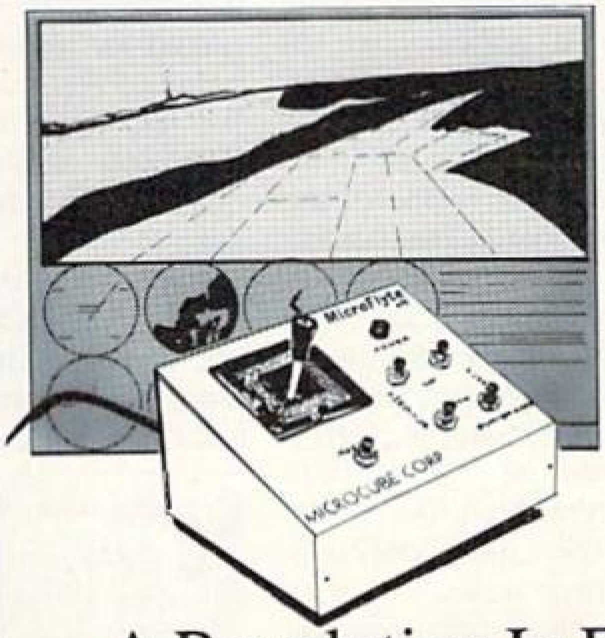

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HOW TO ENTER PROGRAMS

The programs which appear in this magazine have been run, tested and checked for bugs and errors. After a program is tested, it is printed on a letter quality printer with some formatting changes. This listing is then photographed directly and printed in the magazine. Using this method ensures the most error-free program listings possible.

Whenever you see a word inside brackets, such as [DOWN], the word represents a keystroke or series of keystrokes on the keyboard. The word [DOWN] would be entered by pressing the cursor-down key. If multiple keystrokes are required, the number will directly follow the word. For example, [DOWN4] would mean to press the cursor-down key four times. If there are multiple words within one set of brackets, enter the keystrokes directly after one another. For example, [DOWN,RIGHT2] would mean to press the cursor-down key once and then the cursor-right key twice. Note: Do not enter the commas.

In addition to these graphic symbols, the keyboard graphics are all represented by a word and a letter. The word is either SHFT or CMD and represents the SHIFT key or the Commodore key. The letter is one of the letters on the keyboard. The combination [SHIFT E] would be entered by holding down the SHIFT key and pressing the E. A number following the letter tells you how many times to type the letter. For example, [SHFT A4,CMD B3] would mean to hold the SHIFT key and press the A four times, then hold down the Commodore key and press the B three times.

The following chart tells you the keys to press for any word or words inside of brackets. Refer to this chart whenever you aren't sure what keys to press. The little graphic next to the keystrokes shows you what you will see on the screen.

Syntax Error

This is by far the most common error encountered while entering a program. Usually (sorry folks) this means that you have typed something incorrectly on the line the syntax error refers to. If you get the message "?Syntax Error Break In Line 270," type LIST 270 and press RETURN. This will list line 270 to the screen. Look for any non-obvious mistakes like a zero in place of an O or vice-versa. Check for semicolons and colons reversed and extra or missing parentheses. All of these things will cause a syntax error.

There is only one time a syntax error will tell you the wrong line to look at. If the line the syntax error refers to has a function call (e.g., FN A(3)), the syntax error may be in the line that defines the function, rather than the line named in the error message. Look for a line near the beginning of the program (usually) that has DEF FN A(X) in it with an equation following it. Look for a typo in the equation part of this definition.

Illegal Quantity Error

This is another common error message. This can also be caused by a typing error, but it is a little harder to find. Once again, list the line number that the error message refers to. There is probably a poke statement on this line. If there is, then the error is referring to what is trying to be poked. A number must be in the range of zero to 255 to be poke-able. For example, the statement POKE 1024,260 would produce an illegal quantity error because 260 is greater than 255.

Most often, the value being poked is a variable (A,X...). This error is telling you that this variable is out of range. If the variable is being read from data statements, then the problem is somewhere in the data statements. Check the data statements for missing commas or other typos.

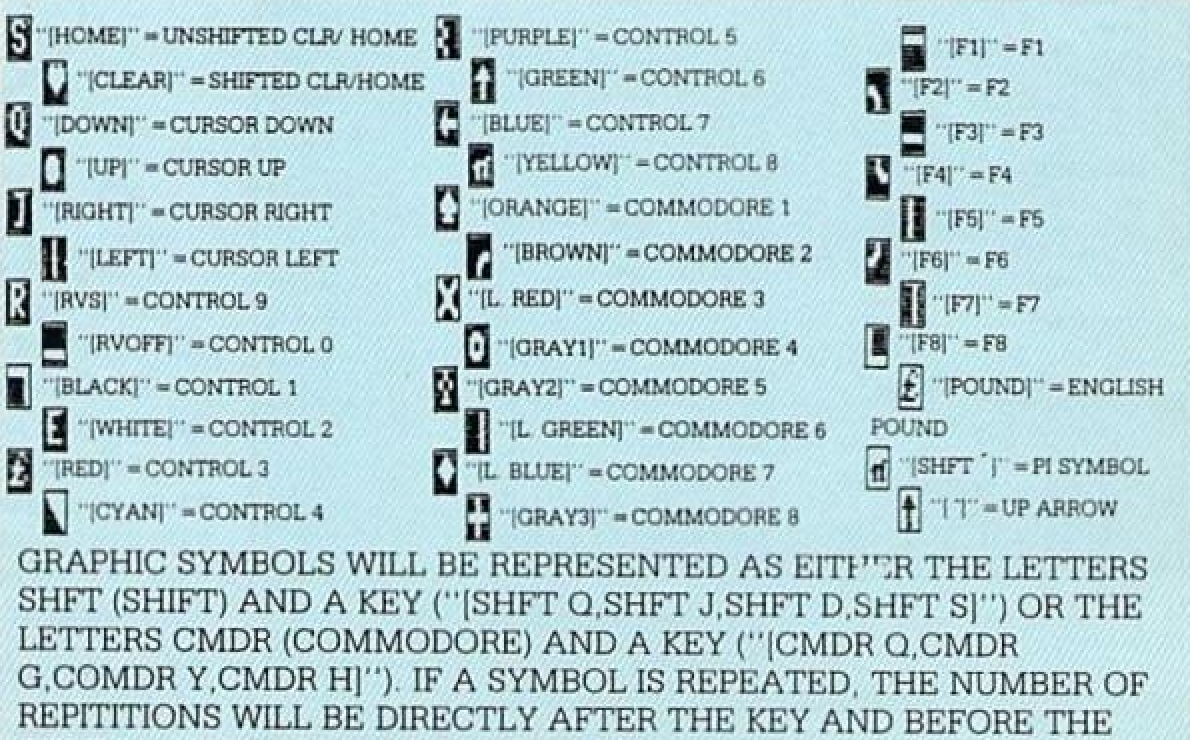
If the variable is not coming from data statements, then the problem will be a little harder to find. Check each line that contains the variable for typing mistakes.

Out Of Data Error

This error message is always related to the data statements in a program. If this error occurs, it means that the program has run out of data items before it was supposed to. It is usually caused by a problem or typo in the data statements. Check first to see if you have left out a whole line of data. Next, check for missing commas between numbers. Reading data from a page of a magazine can be a strain on the brain, so use a ruler or a piece of paper or anything else to help you keep track of where you are as you enter the data.

Other Problems

It is important to remember that the 64 and the PET/CBM computers will only accept a line up to 80 characters long. The VIC 20 will accept a line up to 88 characters long and the 128 a line up to 160 characters long. Sometimes you will find a line in a program that runs over this number of characters. This is not a mistake in the listing. Sometimes programmers get so carried away crunching programs that they use abbreviated commands to get more than the standard number of characters on one line.



"[HOME]" = UNSHIFTED CLR/ HOME
"[CLEAR]" = SHIFTED CLR/HOME
"[DOWN]" = CURSOR DOWN
"[UP]" = CURSOR UP
"[RIGHT]" = CURSOR RIGHT
"[LEFT]" = CURSOR LEFT
"[RVS]" = CONTROL 9
"[RVOFF]" = CONTROL 0
"[BLACK]" = CONTROL 1
"[WHITE]" = CONTROL 2
"[RED]" = CONTROL 3
"[CYAN]" = CONTROL 4
"[PURPLE]" = CONTROL 5
"[GREEN]" = CONTROL 6
"[BLUE]" = CONTROL 7
"[YELLOW]" = CONTROL 8
"[ORANGE]" = COMMODORE 1
"[BROWN]" = COMMODORE 2
"[L. RED]" = COMMODORE 3
"[GRAY1]" = COMMODORE 4
"[GRAY2]" = COMMODORE 5
"[L. GREEN]" = COMMODORE 6
"[L. BLUE]" = COMMODORE 7
"[GRAY3]" = COMMODORE 8
"[F1]" = F1
"[F2]" = F2
"[F3]" = F3
"[F4]" = F4
"[F5]" = F5
"[F6]" = F6
"[F7]" = F7
"[F8]" = F8
"[POUND]" = ENGLISH POUND
"[SHFT ´]" = PI SYMBOL
"[´]" = UP ARROW

GRAPHIC SYMBOLS WILL BE REPRESENTED AS EITHER THE LETTERS SHFT (SHIFT) AND A KEY ("[SHFT Q,SHFT J,SHFT D,SHFT S]") OR THE LETTERS CMDR (COMMODORE) AND A KEY ("[CMDR Q,CMDR G,COMDR Y,CMDR H]"). IF A SYMBOL IS REPEATED, THE NUMBER OF REPITITIONS WILL BE DIRECTLY AFTER THE KEY AND BEFORE THE COMMA ("[SPACE3,SHFT S4,CMDR M2]").

HOW TO ENTER PROGRAMS

You can enter these lines by abbreviating the commands when you enter the line. The abbreviations for BASIC commands are in your user guide.

If you type a line that is longer than the acceptable number of characters, the computer will act as if everything is ok, until you press RETURN. Then, a syntax error will be displayed (without a line number). Many people write that the computer gives them a syntax error when they type the line, or that the computer refuses to accept a line. Both of these problems are results of typing a line that has too many characters.

The Program Won't Run!!

This is the hardest of problems to resolve; no error message is displayed, but the program just doesn't run. This can be caused by many small mistakes typing a program in. First check that the program was written for the computer you are using. Check to see if you have left out any lines of the program. Check each line of the program for typos or missing parts. Finally, press the RUN/STOP key while the program is "running." Write down the line the program broke at and try to follow the program backwards from this point, looking for problems.

If All Else Fails

You've come to the end of your rope. You can't get the program to run and you can't find any errors in your typing. What do you do? As always, we suggest that you try a local user group for help. In a group of even just a dozen members, someone is bound to have typed in the same program. The user group may also have the program on a library disk and be willing to make a copy for you. For $9.95 per issue, you can also get all the BASIC programs in each issue, as well, from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007.

If you do get a working copy, be sure to compare it to your own version so that you can learn from your errors and increase your understanding of programming.

If you live in the country, don't have a local user group, or you simply can't get any help, write to us. If you do write to us, include the following information about the program you are having problems with:

The name of the program
The issue of the magazine it was in
The computer you are using
Any error messages and the line numbers
Anything displayed on the screen
A printout of your listing (if possible)

All of this information is helpful in answering your questions about why a program doesn't work. A letter that simply states "I get an error in line 250 whenever I run the program" doesn't give us much to go on. Send your questions to:

Commodore Magazines
1200 Wilson Drive
West Chester, PA 19380
ATTN: Program Problem

HOW TO USE THE MAGAZINE ENTRY PROGRAMS

The Magazine Entry Programs on the next pages are two BASIC machine language programs that will assist you in entering the programs in this magazine correctly. There are versions for both the Commodore 64 and the Commodore 128. Once the program is in place, it works its magic without you having to do anything else. The program will not let you enter a line if there is a typing mistake on it, and better yet, it identifies the kind of error for you.

Getting Started

Type in the Magazine Entry Program carefully and save it as you go along (just in case). Once the whole program is typed in, save it again on tape or disk. Now RUN the program. The word POKING will appear on the top of the screen with a number. The number will increment from 49152 up to 49900 (4864-5545 on the 128) and just lets you know that the program is running. If everything is ok, the program will finish running and say DONE. Then type NEW. If there is a problem with the data statements, the program will tell you where to find the problem. Otherwise the program will say "mistake in data statements." Check to see if commas are missing, or if you have used periods instead of commas. Also check the individual data items.

Once the program has run, it is in memory ready to go. To activate the program type SYS49152 (SYS4864 on the 128), and press RETURN. You are now ready to enter the programs from the magazine. To disable the Entry Program, just type KILL (RETURN) on the 64 or SYS4867 on the 128.

The checksums for each line are the same for both the 64 and 128, so you can enter your 64 programs on the 128 if you'd like.

Typing the Programs

All the BASIC program listings in this magazine that are for the 64 or 128 have an apostrophe followed by four letters at the end of the line (e.g., 'ACDF). If you plan to use the Magazine Entry Program to enter your programs, the apostrophe and letters **should** be entered along with the rest of the line. This is a checksum that the Magazine Entry Program uses.

Enter the line and the letters at the end and then press RETURN, just as you normally would.

If the line is entered correctly, a bell is sounded and the line is entered into the computer's memory (without the characters at the end).

If a mistake was made while entering the line, a noise is sounded and an error message is displayed. Read the error message, then press any key to erase the message and correct the line.

IMPORTANT

If the Magazine Entry Program sees a mistake on a line, it **does not** enter that line into memory. This makes it impossible to enter a line incorrectly.

Error Messages and What They Mean

There are five error messages that the Magazine Entry Program uses. Here they are, along with what they mean and how to fix them.

Continued next page

HOW TO USE THE MAGAZINE ENTRY PROGRAMS

NO CHECKSUM: This means that you forgot to enter the apostrophe and the four letters at the end of the line. Move the cursor to the end of the line you just typed and enter the checksum.

QUOTE: This means that you forgot (or added) a quote mark somewhere in the line. Check the line in the magazine and correct the quote.

KEYWORD: This means that you have either forgotten a command or spelled one of the BASIC keywords (GOTO, PRINT. .) incorrectly. Check the line in the magazine again and check your spelling.

# OF CHARACTERS: This means that you have either entered extra characters or missed some characters. Check the line in the magazine again. This error message will also occur if you misspell a BASIC command, but create another keyword in doing so. For example, if you misspell PRINT as PRONT, the 64 sees the letter P and R, the BASIC keyword ON and then the letter T. Because it sees the keyword ON, it thinks you've got too many characters, instead of a simple misspelling. Check spelling of BASIC commands if you can't find anything else wrong.

UNIDENTIFIED: This means that you have either made a simple spelling error, you typed the wrong line number, or you typed the checksum incorrectly. Spelling errors could be the wrong number of spaces inside quotes, a variable spelled wrong, or a word misspelled. Check the line in the magazine again and correct the mistake.

MAGAZINE ENTRY PROGRAM—64

The Magazine Entry Programs are available on disk, along with the other programs in this magazine, for $9.95. To order, contact Loadstar at 1-800-831-2694.

```
10 PRINT"[CLEAR]POKING -";
20 P=49152 :REM $C000  (END AT
   49900/$C2EC)
30 READ A$:IF A$="END"THEN 110
40 L=ASC(MID$(A$,2,1))
50 H=ASC(MID$(A$,1,1))
60 L=L-48:IF L>9 THEN L=L-7
70 H=H-48:IF H>9 THEN H=H-7
80 PRINT"[HOME,RIGHT12]"P;
90 IF H>15 OR L>15 THEN PRINT
   :PRINT"DATA ERROR IN LINE";
   1000+INT((P-49152)/8):STOP
100 B=H*16+L:POKE P,B:T=T+B:P=P+1
    :GOTO 30
110 IF T<>86200 THEN PRINT
    :PRINT"MISTAKE IN DATA --> CHECK
    DATA STATEMENTS":END
120 PRINT"DONE":END
1000 DATA 4C,1F,C0,00,00,00,00,00
1001 DATA 00,00,00,00,00,0D,00,21
1002 DATA C1,27,C1,2F,C1,3F,C1,4C
1003 DATA C1,EA,EA,EA,4C,54,C0,A2
1004 DATA 05,BD,19,C0,95,73,CA,10
1005 DATA F8,60,60,A0,03,B9,00,02
1006 DATA D9,04,C1,D0,F5,88,10,F5
1007 DATA A0,05,B9,A2,E3,99,73,00
1008 DATA 88,10,F7,A9,00,8D,18,D4
1009 DATA 4C,EF,C0,E6,7A,D0,02,E6
1010 DATA 7B,4C,79,00,A5,9D,F0,F3
1011 DATA A5,7A,C9,FF,D0,ED,A5,7B
1012 DATA C9,01,D0,E7,20,2B,C0,AD
1013 DATA 00,02,20,74,C0,90,DC,A0
1014 DATA 00,4C,A9,C1,C9,30,30,06
1015 DATA C9,3A,10,02,38,60,18,60
1016 DATA C8,B1,7A,C9,20,D0,03,C8
1017 DATA D0,F7,B1,7A,60,18,C8,B1
1018 DATA 7A,F0,37,C9,22,F0,F5,6D
1019 DATA 03,C0,8D,03,C0,AD,04,C0
1020 DATA 69,00,8D,04,C0,4C,8E,C0
1021 DATA 18,6D,05,C0,8D,05,C0,90
1022 DATA 03,EE,06,C0,EE,09,C0,4C
1023 DATA CE,C1,18,6D,08,C0,8D,08
1024 DATA C0,90,03,EE,07,C0,EE,0A
1025 DATA C0,60,0A,A8,B9,0F,C0,85
1026 DATA FB,B9,10,C0,85,FC,A0,00
1027 DATA A9,12,20,D2,FF,B1,FB,F0
1028 DATA 06,20,D2,FF,C8,D0,F6,20
1029 DATA BC,C2,20,E4,FF,F0,FB,A0
1030 DATA 18,B9,08,C1,20,D2,FF,88
1031 DATA 10,F7,68,68,A9,00,8D,00
1032 DATA 02,4C,74,A4,4B,49,4C,4C
1033 DATA 91,91,0D,20,20,20,20,20
1034 DATA 20,20,20,20,20,20,20,20
1035 DATA 20,20,20,20,20,20,20,91
1036 DATA 0D,51,55,4F,54,45,00,4B
1037 DATA 45,59,57,4F,52,44,00,23
1038 DATA 20,4F,46,20,43,48,41,52
1039 DATA 41,43,54,45,52,53,00,55
1040 DATA 4E,49,44,45,4E,54,49,46
1041 DATA 49,45,44,00,4E,4F,20,43
1042 DATA 48,45,43,4B,53,55,4D,00
1043 DATA C8,B1,7A,D0,FB,84,FD,C0
1044 DATA 09,10,03,4C,84,C1,88,88
1045 DATA 88,88,88,B1,7A,C9,27,D0
1046 DATA 13,A9,00,91,7A,C8,A2,00
1047 DATA B1,7A,9D,3C,03,C8,E8,E0
1048 DATA 04,D0,F5,60,A9,04,4C,CA
1049 DATA C0,A0,00,B9,00,02,99,40
1050 DATA 03,F0,F0,C8,D0,F5,A0,00
1051 DATA B9,40,03,F0,E6,99,00,02
1052 DATA C8,D0,F5,20,96,C1,4C,12
1053 DATA C2,A0,09,A9,00,99,03,C0
1054 DATA 8D,3C,03,88,10,F7,A9,80
1055 DATA 85,02,A0,00,20,58,C1,20
1056 DATA 89,C1,20,ED,C1,E6,7A,E6
1057 DATA 7B,20,7C,A5,A0,00,20,80
1058 DATA C0,F0,D0,24,02,F0,06,4C
1059 DATA A8,C0,4C,CE,C1,C9,22,D0
1060 DATA 06,20,8D,C0,4C,CE,C1,20
1061 DATA BA,C0,4C,CE,C1,A0,00,B9
1062 DATA 00,02,20,74,C0,C8,90,0A
1063 DATA 18,6D,07,C0,8D,07,C0,4C
1064 DATA EF,C1,88,A2,00,B9,00,02
1065 DATA 9D,00,02,F0,04,E8,C8,D0
1066 DATA F4,60,18,AD,09,C0,69,41
1067 DATA 8D,09,C0,38,AD,0A,C0,E9
1068 DATA 19,90,06,8D,0A,C0,4C,1C
1069 DATA C2,AD,0A,C0,69,41,8D,0A
```

```
1070 DATA C0,AD,03,C0,6D,05,C0,48
1071 DATA AD,04,C0,6D,06,C0,8D,0C
1072 DATA C0,68,6D,08,C0,8D,0B,C0
1073 DATA AD,0C,C0,6D,07,C0,8D,0C
1074 DATA C0,38,E9,19,90,06,8D,0C
1075 DATA C0,4C,52,C2,AD,0C,C0,69
1076 DATA 41,8D,0C,C0,AD,0B,C0,E9
1077 DATA 19,90,06,8D,0B,C0,4C,67
1078 DATA C2,AD,0B,C0,69,41,8D,0B
1079 DATA C0,A0,01,AD,09,C0,CD,3C
1080 DATA 03,D0,20,C8,AD,0A,C0,CD
1081 DATA 3D,03,D0,17,C8,AD,0B,C0
1082 DATA CD,3E,03,D0,0E,AD,0C,C0
1083 DATA CD,3F,03,D0,06,20,CC,C2
1084 DATA 4C,4B,C0,98,48,68,4C,CA
1085 DATA C0,A9,20,8D,00,D4,8D,01
1086 DATA D4,A9,09,8D,05,D4,A9,0F
1087 DATA 8D,18,D4,60,20,A9,C2,A9
1088 DATA 81,20,DF,C2,A9,80,20,DF
1089 DATA C2,4C,D9,C2,20,A9,C2,A9
1090 DATA 11,20,DF,C2,A9,10,20,DF
1091 DATA C2,A9,00,8D,04,D4,60,8D
1092 DATA 04,D4,A2,70,A0,00,88,D0
1093 DATA FD,CA,D0,FA,60,END
```

END

MAGAZINE ENTRY PROGRAM–128

```
5 TRAP 200
10 PRINT"[CLEAR]POKING -";
20 P=4864 :REM $1300  (END AT
   5545/$15A9)
30 READ A$:IF A$="END"THEN 110
80 PRINT"[HOME,RIGHT12]"P;
100 B=DEC(A$):POKE P,B:T=T+B:P=P+1
    :GOTO 30
110 IF T<>59314 THEN PRINT
    :PRINT"MISTAKE IN DATA --> CHECK
    DATA STATEMENTS":END
120 PRINT"DONE":END
200 PRINT:PRINT"DATA ERROR IN LINE";
    1000+INT((P-4864)/8):END
1000 DATA 4C,1E,13,4C,3A,13,00,00
1001 DATA 8E,00,F7,00,42,41,51,57
1002 DATA 0D,00,0D,43,08,14,0E,14
1003 DATA 16,14,26,14,33,14,A9,00
1004 DATA 8D,00,FF,AD,04,03,8D,12
1005 DATA 13,AD,05,03,8D,13,13,A2
1006 DATA 4A,A0,13,8E,04,03,8C,05
1007 DATA 03,60,AD,12,13,8D,04,03
1008 DATA AD,13,13,8D,05,03,60,6C
1009 DATA 12,13,A5,7F,D0,F9,AD,00
1010 DATA 02,20,5B,13,90,F1,A0,00
1011 DATA 4C,6F,14,C9,30,30,06,C9
1012 DATA 3A,10,02,38,60,18,60,C8
1013 DATA B1,3D,C9,20,D0,03,C8,D0
1014 DATA F7,B1,3D,60,18,C8,B1,3D
1015 DATA F0,35,C9,22,F0,F5,6D,06
1016 DATA 13,8D,06,13,AD,07,13,69
1017 DATA 00,8D,07,13,4C,75,13,18
1018 DATA 6D,08,13,8D,08,13,90,03
1019 DATA EE,09,13,EE,0C,13,60,18
1020 DATA 6D,0B,13,8D,0B,13,90,03
1021 DATA EE,0A,13,EE,0D,13,60,0A
1022 DATA A8,B9,14,13,85,FB,B9,15
1023 DATA 13,85,FC,A0,00,8C,00,FF
1024 DATA A9,12,20,D2,FF,B1,FB,F0
1025 DATA 06,20,D2,FF,C8,D0,F6,20
1026 DATA 79,15,20,A3,15,20,E4,FF
1027 DATA F0,FB,A0,1B,B9,EF,13,20
1028 DATA D2,FF,88,10,F7,68,68,A9
1029 DATA 00,8D,00,02,4C,B7,4D,91
1030 DATA 91,0D,20,20,20,20,20,20
1031 DATA 20,20,20,20,20,20,20,20
1032 DATA 20,20,20,20,20,20,91,0D
1033 DATA 51,55,4F,54,45,00,4B,45
1034 DATA 59,57,4F,52,44,00,23,20
1035 DATA 4F,46,20,43,48,41,52,41
1036 DATA 43,54,45,52,53,00,55,4E
1037 DATA 49,44,45,4E,54,49,46,49
1038 DATA 45,44,00,4E,4F,20,43,48
1039 DATA 45,43,4B,53,55,4D,00,C8
1040 DATA B1,3D,D0,FB,C0,09,10,03
1041 DATA 4C,69,14,88,88,88,88,88
1042 DATA B1,3D,C9,27,D0,13,A9,00
1043 DATA 91,3D,C8,A2,00,B1,3D,9D
1044 DATA 00,0B,C8,E8,E0,04,D0,F5
1045 DATA 60,4C,5C,15,4C,C5,14,A0
1046 DATA 09,A9,00,99,06,13,8D,00
1047 DATA 0B,88,10,F7,A9,80,85,FD
1048 DATA A0,00,20,3F,14,20,AE,14
1049 DATA 20,0D,43,84,FA,A0,FF,20
1050 DATA 67,13,F0,D8,24,FD,F0,06
1051 DATA 20,8F,13,4C,8F,14,C9,22
1052 DATA D0,06,20,74,13,4C,8F,14
1053 DATA 20,9F,13,4C,8F,14,A0,00
1054 DATA B9,00,02,20,5B,13,C8,90
1055 DATA 0A,18,6D,0A,13,8D,0A,13
1056 DATA 4C,B0,14,88,60,18,AD,0C
1057 DATA 13,69,41,8D,0C,13,38,AD
1058 DATA 0D,13,E9,19,90,06,8D,0D
1059 DATA 13,4C,CF,14,AD,0D,13,69
1060 DATA 41,8D,0D,13,AD,06,13,6D
1061 DATA 08,13,48,AD,07,13,6D,09
1062 DATA 13,8D,0F,13,68,6D,0B,13
1063 DATA 8D,0E,13,AD,0F,13,6D,0A
1064 DATA 13,8D,0F,13,38,E9,19,90
1065 DATA 06,8D,0F,13,4C,05,15,AD
1066 DATA 0F,13,69,41,8D,0F,13,AD
1067 DATA 0E,13,E9,19,90,06,8D,0E
1068 DATA 13,4C,1A,15,AD,0E,13,69
1069 DATA 41,8D,0E,13,A0,01,AD,0C
1070 DATA 13,CD,00,0B,D0,20,C8,AD
1071 DATA 0D,13,CD,01,0B,D0,17,C8
1072 DATA AD,0E,13,CD,02,0B,D0,0E
1073 DATA AD,0F,13,CD,03,0B,D0,06
1074 DATA 20,89,15,A4,FA,60,98,48
1075 DATA 68,4C,AF,13,A9,04,4C,AF
1076 DATA 13,A9,00,8D,00,FF,A9,20
1077 DATA 8D,00,D4,8D,01,D4,A9,09
1078 DATA 8D,05,D4,A9,0F,8D,18,D4
1079 DATA 60,20,61,15,A9,81,20,9C
1080 DATA 15,A9,80,20,9C,15,4C,96
1081 DATA 15,20,61,15,A9,11,20,9C
1082 DATA 15,A9,10,20,9C,15,A9,00
1083 DATA 8D,04,D4,60,8D,04,D4,A2
1084 DATA 70,A0,00,88,D0,FD,CA,D0
1085 DATA FA,60,END
```

END

Superbase 128

Programable Database

For the Commodore 128

Superbase the only fully programmable database for the Commodore 128. The first time I saw Superbase 128 in action was while I was in England. I was so impressed by the sheer power of Superbase that I bought several copies to manage my office better. Many of my friends and business associates wanted copies for their own use. A distribution network was born!

Now, Progressive Peripherals & Software is the exclusive distributor of Precision Software products in North America. You just can't find a better database for the Commodore 128! The easy to use, menu driven approach means you'll be up and running in minutes. You won't have to waste hours fighting a bear of a manual when you own Superbase 128.

Until you sit down and use Superbase 128, you won't believe what it can do for you. Superscript 128, (the word processing program from Precision Software), co-resides in memory. Now you can easily swap data between Superbase 128 and Superscript 128, without swapping disks.

Of course, you'll be able to take full advantage of the space on all Commodore disk drive models. Upgrading to Superbase 128 is no problem. Superbase 128 can read ('import') data files from Superbase 64 and many other database programs to guarantee data compatibility. You'll love the flexibility of 40 or 80 column screen support too!

Find any record you want in less than three tenths of a second with your 1571 disk drive. That's fast!

Program with over 100 extended Basic commands. Superbase 128 uses version 7.0 BASIC commands which let you design serious custom applications to handle your toughest chores. Complete subtotaling, percentage and other mathematical functions turn your Commodore 128 into a proven system able to manage complicated business applications.

Organize all your information in the flexible and functional Superbase 128. Superbase uses state of the art indexing to make file accessing almost instantaneous. Find any record you want in less than three tenths of a second with your 1571 disk drive. Regardless of your file size!

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The easy to use, menu driven approach means you'll be up and running in minutes.

Reflections of one Superbase 128 user. 'It does everything I want it to! The programming capabilities of Superbase 128 lets me build my own system of menus. My office is completely organized the way I want it. Now everyone in my office can easily access customer files.....without knowing anything about Superbase! That's a big help to me and my customers - it saves time and money!'

For more information about Superbase 128, please call or write us. Now available at your favorite dealer for only $99.95.

Superbase 128 and many other innovative products are now available at your local dealer, or directly from Progressive Peripherals & Software. Superbase is also available for the Commodore 64 and the Apple IIc/IIe.

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FILER

Continued from pg. 45

> Pocket Filer *can read and use files created with another data base without your having to rekey the data.*

customers, you might want to print out the information in several different ways. (The Report module lets you create and save up to nine different report layouts for each file.) Your first report layout might be a mailing list, while the second might print out customers sorted by states for your regional sales manager's use.

You might then want a report which would sort through the file and print out the names, account numbers and addresses of all your customers who are behind on payments. Or you might want to pick out all the customers who have increased their business with you to send them a

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thank you card and a box of candy.

The Report module reserves two sections to execute math statements and functions, so the user can perform math functions on selected data and report results. This lets the program compare information such as sales, inventory, and profit, and either print or pass a record, depending upon the math's calculation.

If you need a data base which can perform complicated math functions, *Pocket Filer* supports everything from addition to logarithm, modulo to random numbers, sine to inverse hyperbolic cotangents, and everything in between.

The final module is called File Utilities. It copies important files for security, using either one or two disk drives. You can also restructure a file here, adding or subtracting fields from a previously used file as well as converting Commodore sequential files. This means *Pocket Filer* can read and use files created with another data base without your having to rekey the data. Anyone who has ever had to manually duplicate a file will appreciate this welcome option. It not only saves time, but also eliminates rekeying errors.

Users of non-CBM printers will be happy to know that *Pocket Filer* supports almost every printer on the market. I used it with both an NEC and Star printer.

Pocket Filer is well worth the asking price, and anyone who has used any of Digital Solutions' software can attest to the high quality of the programs they produce. Once you master *Pocket Filer,* using it is simple and logical. Because *Pocket Filer* is one of a trio of integrated programs from Digital Solutions, data created or stored by it can be duplicated by the word processor, *Pocket Writer,* and the spreadsheet, *Pocket Planner.* Add that to the program's powerful math functions, flexible report capabilities, logical command codes, its ability to ready all CBM sequential files, plus a reasonable price, and you've got a powerful and flexible data base.

Ed. Note: Pocket Filer and its sister programs, Pocket Writer and Pocket Planner, were formerly titled Paperback Filer, Paperback Writer and Paperback Planner.

Superscript 128
Word Processor
For the Commodore 128

SUPERSCRIPT 128
The Better Word Processor
By Steven L. Spring
President of PP&S

Superscript 128, the intelligent word processor for the C-128 from Progressive Peripherals & Software that goes beyond the competition.

I always look for the best in new software developments. When I saw Superscript 128 in action, I knew it was the best word processor available. So I asked Precision Software of England if I could sell Superscript in the U.S. and Canada. Because of my reputation for customer service and quality products, Precision agreed.

Unequalled power! Superscript 128 is the only full featured word processor that gives you complete control over every aspect of your document, your printer and your screen. All commands are menu accessible- you never have to use hard to remember commands or keys sequences. Even create your own time saving macro commands.

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Powerful commands! Superscript 128 can support every printer you'll ever own. Just load in your printer parameters and Superscript 128 is ready to print out professional quality letters, reports and lists. There's even a full featured spelling checker to keep your documents accurate. Superscript 128 is **the** Super word processor.

Superscript 128 also has a powerful mail merge facility. You can command Superscript 128 to retrieve information from your Superbase 128 files. Since both programs "co-reside" in memory together, there's no time consuming disk swapping to slow you down. Only top of the line products like Superscript 128 and Superbase 128 can integrate.

Superscript 128 also includes a full function calculator that you can use interactively with your document. Now you can add, subtract, multiply and divide columns of numbers within your document. Superscript 128 is much more than a word processor.... it's true productivity enhancment tool for the C-128 computer.

Enormously popular! Superscript now has over 400,000 copies worldwide. Thousands have been upgraded to Superscript 128. Visit your dealer or call Progressive Peripherals & Software for your copy today!

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For more information about Superscript 128, please call or write us. Now available at your favorite dealer for only $79.95

Superscript 128 and many other innovative products are now available at your local dealer, or directly from Progressive Peripherals & Software. Superscript is also available for the Commodore 64, Apple IIc/IIe and the Atari 800XL/130XE computers.

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Continued from pg. 22

In this sequel to Boulder Dash, *the ever resilient Rockford has returned to burrow through 16 new underground mazes.*

wall of amoebas. Another grotto might have you avoid fireflies to reach your treasure, where the next will have you bait them into a chase.

The structure of game play itself also contains variable elements. Since this style maze game demands that the contestant form his own route, every time a different path is blazed, the underground world shifts accordingly, creating the potential for new problems. Even when a workable diamond-hoarding answer is found, experimentation may lead to a more economical use of time, more profitable pickings, and in the end, a better score. Then again, it may also lead to an unplanned boulder burial. But these are the risks in a game that encourages innovative thinking and improvisation.

Liepa has included all the options and extras you might want. One or two people can play, beginning at any of four different starting points, with four playable intermissions, five different skill levels, and the ability to earn extra Rockfords. And as an added bonus, Electronic Arts was so certain that your love for this sequel would cause you to rush right out and purchase the award-winning original version that they have included it on the flip side of the disk. That's two superior arcade games for the price of one.

Can you dig it?

The Rockford Files

How to Become a Rock Star

Peter Liepa isn't all bad. Although his puzzle designs are sure to induce a few advanced cases of brain strain, he has been kind enough to provide a couple of pages' worth of player hints to help the frustrated Rockford burrow back on track. To supplement his *Super Boulder Dash* tips, I've listed some additional aid for a few of the caves. As Liepa suggests, try to first solve each tunnel trial without any outside help, and only refer to these clues if you feel hopelessly lost.

Hints for the original *Boulder Dash* are included in my review in the April/May, 1985, issue of *Commodore Power/Play.*

- Introduction: Following the technique outlined in the demo will certainly be helpful, but see if you can't kill a couple of extra fireflies and pocket a few more diamonds. More points mean more Rockfords.
- Silos: Let the amoebas grow wild, capping the screen's top with a rock on one end and your surrogate on the other. Then clear the newly formed two-tier diamond-fest before moving below.
- Spiral: Remember the fireflies' inbred movement, clearing an area to let them roam alone.
- Breakthrough: I've found it best to release the top two squadrons before even attempting a pass. Once past the amoeba, move quickly!
- Gauntlet: To avoid distraction when trying to pick up the rhythm, plan your move by watching the firefly on the platform below. And remember, you don't have to physically move on top of an object to affect it. A nudge from the side will do just as well.
- Jail: It's easier to complete this puzzle if you don't release any fireflies until after you've gathered the required number of jewels.
- Ring: Move right along the edge of the amoeba to insure fly contact.
- Snake: You don't have to collect all the diamonds to meet your quota, so keep moving and don't panic if you miss a few. Stay away from the bottom right corner (your exit) until the end.
- Gridlock: Pushing a few rocks around will keep paths open, especially along the bottom row.
- Combination: Keep an eye out for the path you can line up on the fourth and sixth rows above you. It will take some creative rock juggling, but it can be done.

ACRO JET

Continued from page 26

As a tribute to the sport of stunt flying, AcroJet *is fast-paced, challenging, and a lot of fun.*

Even with so much taking place at once, flying your AcroJet is surprisingly simple. Mastering the loops, rolls and turns that make up each event, however, is another matter. Crashing into a ball of flames is inevitable for beginners, but with practice comes confidence and skill.

Landing is by far one of the greatest challenges of *AcroJet.* The biggest mistake made by beginners is to overreact with the joystick, usually ending a perfect flight in disaster. The trick is to approach the landing strip high and slow, with the jet's nose turned slightly up. Touch down on the two rear wheels first, immediately kill the engine and hit the brakes. The landing strip is very short so there's little margin for error. A successful landing is a tremendous ego boost.

Looping is another problem area, with the best results coming from simple trial and error. The key here is controlling your altitude with speed and careful timing. Going over the top can be disorienting, and with the high speeds reached on the back side of a loop, it's easy to blindly run your plane smack into the ground. Start with large, high loops and work into tighter low-altitude maneuvers.

Another common mistake occurs when flying at top speed for too long. If you allow the exhaust temperature to exceed 700 degrees, the engine shuts down and you eventually crash. Periodically reduce the throttle to avoid burnouts.

Typical of MicroProse, the instruction manual is well written and a real pleasure to read. Graphically, *AcroJet* is crisp and colorful, although a bit sparse. The real emphasis here is on game play, in which it delivers a flawless performance.

More than any other flight simulator, *AcroJet* is essentially a celebration of flight. As a pure test of flying skill, you can't do any better than this and still have both feet on the ground.

Continued from pg. 44

> *A 1541 disk drive using Vorpal files can load a 100-block file in five seconds.*

step through each utility and offer an abort option at each step.

Vorpal's diverse collection of utilities includes most of the drive tools I wish had been included in the 64's on-board disk operating system. They include the following.

Head Alignment Speed Check: This utility checks the drive's alignment, reports its condition, and if it is out of whack, it automatically corrects it. I used it to check four different drives, and compared *Vorpal's* analysis with that of a dedicated alignment program and found the results identical. Since all my drives were aligned, I was not able to check the program's alignment correction. A speed check reports the drive's speed, but the program cannot adjust a slow or fast drive.

Copy: This utility will copy an entire disk using one or two drives. By using two disk drives, I was able to duplicate an entire disk in two minutes. I was delighted with this option since my normal copy program takes 20 minutes.

Rename Disk: I found this option helpful since I usually format ten disks at a time so I always have one ready. With this option, I can go back and change the disk's name to reflect the files it contains. For instance, if I format a box of disks on October 24th, I would name them 10/24/86-A thru 10/24/86-J. There's nothing wrong with that except that dates as names don't even hint at the disks' contents. With the Rename Disk option, I can easily change those date/names to reflect their contents.

Protect File: This option lets you protect programs and files from accidental scratches. This is great when you unwisely use the scratch command on the wrong file.

Undelete File: This utility lets you recover the files you've accidentally erased.

Unprotect: This utility removes the scratch protection from a program that you want to change or scratch.

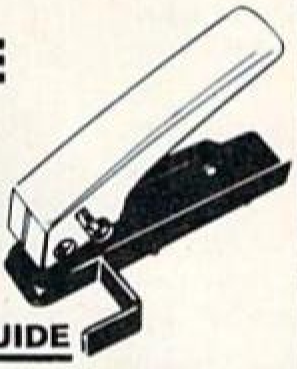
Set Boot File: With this utility, you create an auto boot. This creates a program that loads and runs with the abbreviated load command LOAD"*",8. This is a great option for people who don't like listing and loading from a disk directory and for disks containing programs for children. For instance, if Epyx's *Fast Load* cartridge is used, you can load and run the program by simply pressing the Commodore key and RUN/STOP. Although *Vorpal* works with *Fast Load,* SR? files load at the same speed with or without it.

File Information: Programmers will be interested in this utility because it lists a lot more than just the disk's directory. It checks files for errors, displays starting and ending addresses, length and location of files, and reports the information in both hexadecimal and decimal notations. The utility even lists a relative file's first sector, record length, and number of records the file contains. It will also list both active and deleted (scratched) files. Most people will have little use for all that information, but users who are interested in studying programs, retrieving damaged data, or are just curious about the 1541's housekeeping abilities will love this option.

Vorpal's instruction manual contains only 14 pages, which at first glance appears too brief for a collection of programs as powerful as these. But because *Vorpal* is logically designed and menu-driven, most people won't even need the manual to use the utilities. The instructions, though brief, are direct, complete and easy to understand.

My single complaint is that *Vorpal* does not come in a cartridge. Unfortunately, this means that you can't leave *Vorpal* plugged in at all times.

This is the most useful collection of disk utility programs I've seen for the 1541. I suspect everyone will fall in love with *Vorpal's* speed. The program is worth $29.95 just for its speed alone, and becomes an unbeatable bargain when the alignment and copy utilities are added. ■



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CURSER

Continued from pg. 141

```
   WANT!"'ETQM
60 GOSUB 200'BDFD
70 FOR I = 1 TO 2000'DGTG
80 ROW = RND(1)*25
   :REM SELECT RANDOM LOCATION'EEGO
90 COLUMN = RND(1)*39'DLMJ
100 SYS CRSR,ROW,COLUMN
    :REM MOVE CURSOR'CBLD
110 POKE 646, I AND 15
    :REM SET COLOUR'DRXC
120 PRINT "*";
    :REM PRINT *'CIBA
130 NEXT: END'CBJY
200 SYS CRSR,23,11'BKVX
210 PRINT CHR$(18)" PRESS ANY KEY...
    "'CESD
220 WAIT 198,1: GET A$'CIIA
230 RETURN'BAQY
```

Listing 2. VIC Version

```
0 REM ABCDEFGHIJKLMNOPQRSTUVWXYZ
3 CRSR=PEEK(43)+256*PEEK(44)+5
  :PRINT"SYS"CRSR ",ROW,COLUMN TO USE
4 FOR I = CRSR TO CRSR + 25
5 READ A: POKE I, A: T = T + A
6 NEXT
7 IF T - 3445 THEN PRINT"CHECKSUM
  ERROR": STOP
8 DATA 32,241,215,138,72,160,1,136,
  177,122,201,44,208
9 DATA 5,32,241,215,138,168,104,170,
  24,76,240,255,30
10 PRINT CHR$(147)
20 SYS CRSR,4,7: PRINT CHR$(144)"GOOD
   AFTERNOON"
30 GOSUB 200: SYS CRSR,17,4
   : PRINT CHR$(156)"YOU HAVE
   CONTROL!"
40 GOSUB 200: SYS CRSR,8
   : PRINT CHR$(159)"MESSAGES CAN
   APPEAR-"
50 GOSUB 200: SYS CRSR,12,12
   : PRINT CHR$(31)"ANYWHERE!"
60 GOSUB 200
70 FOR I = 1 TO 2000
80 ROW = RND(1)*23
   :REM SELECT RANDOM LOCATION
90 COLUMN = RND(1)*21
100 SYS CRSR,ROW,COLUMN
    :REM MOVE CURSOR
110 POKE 646, I AND 7
    :REM SET COLOUR
120 PRINT "*";              :REM PRINT *
130 NEXT: END
200 SYS CRSR,21,6
210 PRINT CHR$(18)"PRESS ANY KEY
220 WAIT 198,1: GET A$
230 RETURN
```

END

MUSIC MAKER

Continued from pg. 147

```
1010 DATA 185,0,194,133,251,185,0,
     195'BCPY
1015 DATA 141,0,212,185,0,196,141,
     1'BAUE
1020 DATA 212,238,0,193,173,6,193,
     141'BCKA
1025 DATA 4,212,169,4,141,3,193,
     133'BAFF
1030 DATA 2,76,48,192,173,4,193,
     240'BAUB
1035 DATA 20,173,7,193,41,254,141,
     11'BBCG
1040 DATA 212,169,0,141,4,193,165,
     2'BAFC
1045 DATA 133,252,76,54,192,172,1,
     193'BCRH
1050 DATA 185,0,197,133,252,185,0,
     198'BCWD
1055 DATA 141,7,212,185,0,199,141,
     8'BAMI
1060 DATA 212,238,1,193,173,7,193,
     141'BCME
1065 DATA 11,212,169,1,141,4,193,
     76'BAHJ
1070 DATA 54,192,173,5,193,240,20,
     173'BCMF
1075 DATA 8,193,41,254,141,18,212,
     169'BCQK
1080 DATA 0,141,5,193,165,2,133,
     253'BACG
1085 DATA 76,63,192,172,2,193,185,
     0'BAUL
1090 DATA 200,133,253,185,0,201,141,
     14'BDNH
1095 DATA 212,185,0,202,141,15,212,
     238'BDTM
1100 DATA 2,193,173,8,193,141,18,
     212'BBMY
1105 DATA 169,1,141,5,193,76,63,
     192'BAWE
1160 DATA 160,0,162,0,185,13,193,
     153'BBBF
1165 DATA 2,212,200,232,224,2,208,
     244'BCOK
1170 DATA 200,232,224,5,240,9,185,
     13'BBAG
1175 DATA 193,153,2,212,76,176,193,
     200'BDML
1180 DATA 200,192,21,240,3,76,162,
     193'BCEH
1185 DATA 169,15,141,24,212,76,49,
     234'BCRM
1190 DATA 169,194,133,252,169,0,133,
     251'BEKJ
1195 DATA 168,162,247,145,251,200,
     208'BCON
1200 DATA 251,230,252,232,208,246,
     96'BBPA
```

END

Continued from pg. 139

```
    CK(TL)=1:FL=1:POKE PS+TL-1,
    PV-64'MKJV
475 FOR J=1 TO TL:IF CK(J)=O THEN
    480'GOKR
476 NEXT J:GOTO 340'CFMN
480 IF FL=1 THEN FL=0:GOTO 300'FKML
490 SB=PV-65:POKE AL(SB),PV-64
    :BW=BW+1'GYNR
495 ON BW GOTO 500,510,520,530,540,
    550,560,570'CIUT
500 FOR J=1 TO 10:POKE 1800+J,76
    :NEXT J:GOTO 300'HTDH
510 FOR J=1 TO 9:POKE 1760+J,160
    :NEXT J:POKE 1770,101
    :GOTO 300'IDEK
520 FOR J=1 TO 6:POKE 1722+J,67:NEXT J
    :POKE 1722,107:POKE 1729,115
    :GOTO 300'JLNN
530 POKE 1682,66:POKE 1689,66
    :GOTO 300'DTAH
540 POKE 1642,66:POKE 1649,66
    :GOTO 300'DTRI
550 FOR J=1 TO 6:POKE 1602+J,67:NEXT J
    :POKE 1602,112:POKE 1609,110
    :GOTO 300'JLUQ
560 POKE 1605,114:POKE 1645,93
    :GOTO 300'DUEK
570 POKE 1646,81:POKE 1686,91
    :POKE 1726,91'DXLM
580 FOR J=1 TO 11:POKE S+1,HN(J)
    :POKE S,LN(J):POKE S+4,17
    :FOR K=1 TO DR(J):NEXT K'MMOW
590 POKE S+4,16:NEXT J:PRINT"[HOME,
    DOWN5,SPACE5]THE WORD WAS... ";WD$
    :END'FNNS
600 DATA IN,RE,CO,PRE,I,CA,D,T,S,E,F,
    R,N,EN,ION,ABLE,CE,A,ANY,M,OU'BHVO
610 DATA 5,6,20,10,12,18,5,4,20,5,10,
    12,3,20,1,17,3,2,9,8,4,20,5,9,
    8'BJKM
620 DATA 4,7,2,9,9,3,2,13,8,5,11,12,5,
    14,7,4,4,9,14,8,4,20,21,9,10,2,20,
    19'BPIO
630 DATA 3,13,5,17,2,3,1,3,3,9,8,6,2,
    11,10,12,14,17,5,9,8,2,10,8,3,8,2,
    10,4'BQQP
640 DATA 4,8,14,7,5,3,13,17,7,10,2,2,
    1,2,11,16,5,11,5,9,9,15,3,9,3,2,3,
    9,6'BPFQ
650 DATA 13,3,12,5,17,4,18,3,12,13,2,
    6,2,3,20,5,2,3,8,21,12,4,12,21,8,
    10'BNLR
660 DATA 4,17,20,14,8,3,11,1,10,4,4,
    11,10,12,3,3,20,18,4,9,14,9,10,3,
    6,9'BNSS
670 DATA 8,2,20,14,3,8,14,16,6,4,6,12,
    5,21,9,5,11,12,18,6,9,4,9,1,17,2,
    5'BNRT
680 DATA 3,13,9,8,16,22,96,400,22,96,
    400,22,96,150,22,96,400,28,49'BHBT
690 DATA 400,25,30,150,25,30,400,22,
    96,150,22,96,400,22,96,150,22,96,
    400'BNPV
```

END

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PREBASE

Continued from pg. 151

```
     :WTN$(WV)=STR$(IN):W%=W%+1'JKHQ
6040 SL$(P)=GT$:P=P+1:W$=EW$+STR$(W%)
     :FOR E=1 TO LC:IF LBL$(E)=W$THEN
     6050'MRVT
6041 NEXT E:GOSUB 8000:EM$(EN)="NO
     MATCHING ENDWHILE - ":LV=LV+1
     :GOTO 4060'GAHS
6050 Y=LEN(NUM$(E)):FOR X=1 TO Y
     :SL$(P)=MID$(NUM$(E),X,1):P=P+1
     :NEXT X'KPTT
6060 SL$(P)=N0$:P=P+1:GOSUB 700
     :RETURN'FSSL
7000 IF C$<>N0$THEN GOSUB 8000
     :EM$(EN)="ENDWHILE ERROR - "
     :GOSUB 3000:RETURN'IXON
7003 SL$(P)=GT$:P=P+1:IF WV>0 THEN
     7010'GVDK
7005 GOSUB 8000:EM$(EN)="NO MATCHING
     WHILE - ":LV=LV+1:GOTO 4060'FXTR
7010 Y=LEN(WTN$(WV)):FOR X=1 TO Y
     :SL$(P)=MID$(WTN$(WV),X,1):P=P+1
     :NEXT X'KRPR
7020 WV=WV-1:SL$(P)=N0$:P=P+1
     :GOSUB 700:RETURN'HYCL
8000 IF EN=0 THEN CLOSE 3:PRINT#1,"S0
     :"+P$+".BAS"'HJGI
8005 IF EN<10 THEN EN=EN+1:LE(EN)=SN
     :RETURN'HTKO
8010 CLOSE 2:CLOSE S1'CEWD
8020 PRINT:FOR X=1 TO 40
     :PRINT"[SHFT *]";:NEXT
     :PRINT"(SPACE) TO DISPLAY
     ERRORS"'HJOP
8025 PRINT"[RVS]P[RVOFF]
      TO PRINT ERRORS":PRINT'CBTN
8030 GET C$:IF C$=""THEN 8030'EJMH
8040 IF C$="P"THEN OPEN 4,4:CMD 4'FHRI
8050 PRINT:PRINT P$;"[SPACE2]";DT$;
     " ERRORS IN PASS 2":PRINT'DKBN
8060 FOR X=0 TO 9:PRINT EM$(X);
     SPC(20-LEN(EM$(X)));LE(X)
     :NEXT X'IFUR
8070 IF C$="P"THEN PRINT#4
     :CLOSE 4'FFRL
8080 END'BACI
9000 SL$(1)=RM$:SL$(2)=" "
     :SL$(3)=CHR$(18):P=4'FFWL
9010 FOR X=1 TO LEN(P$)
     :SL$(P)=MID$(P$,X,1):P=P+1
     :NEXT X'JCJO
9020 FOR X=1 TO 6:SL$(P)=" ":P=P+1
     :NEXT X'HQDL
9025 FOR X=1 TO 8:SL$(P)=MID$(DT$,X,1)
     :P=P+1:NEXT X'IABT
9030 SL$(P)=N0$:P=P+1:HN$=CHR$(255)
     :LN$=CHR$(10):GOSUB 700'IJYQ
9040 SL$(1)=RM$:SL$(2)=" "
     :SL$(3)=CHR$(18):P=4'FFWP
9050 FOR X=1 TO LEN(ID$)
     :SL$(P)=MID$(ID$,X,1):P=P+1
     :NEXT X:SL$(P)=N0$:P=P+1'MSUX
9060 HN$=CHR$(255):LN$=CHR$(20)
     :GOSUB 700:RETURN'GVFP
```

END

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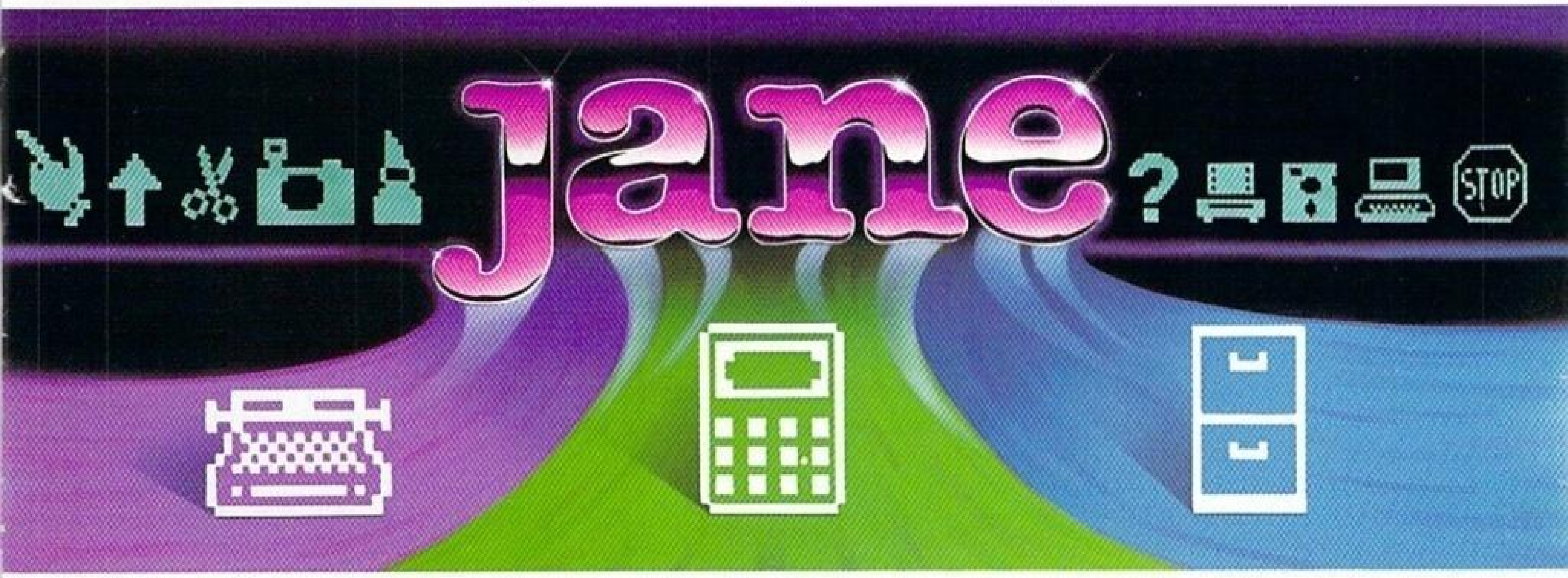

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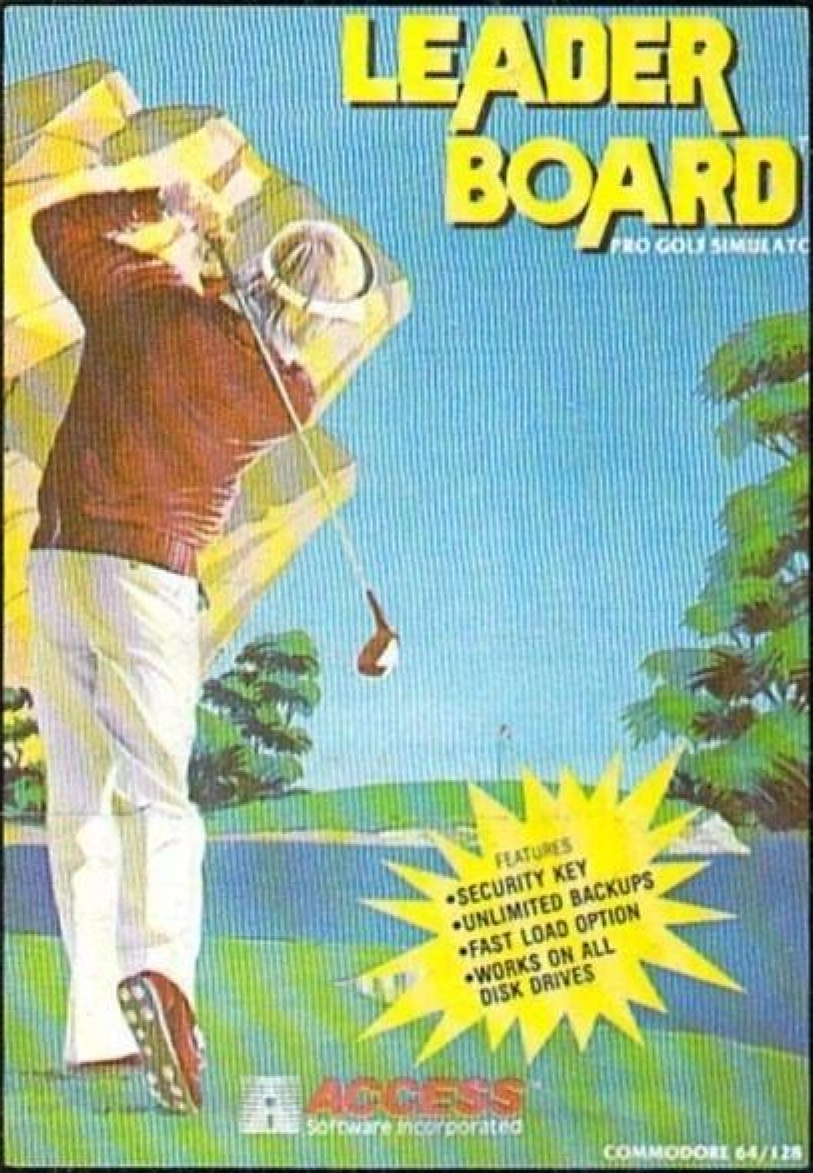
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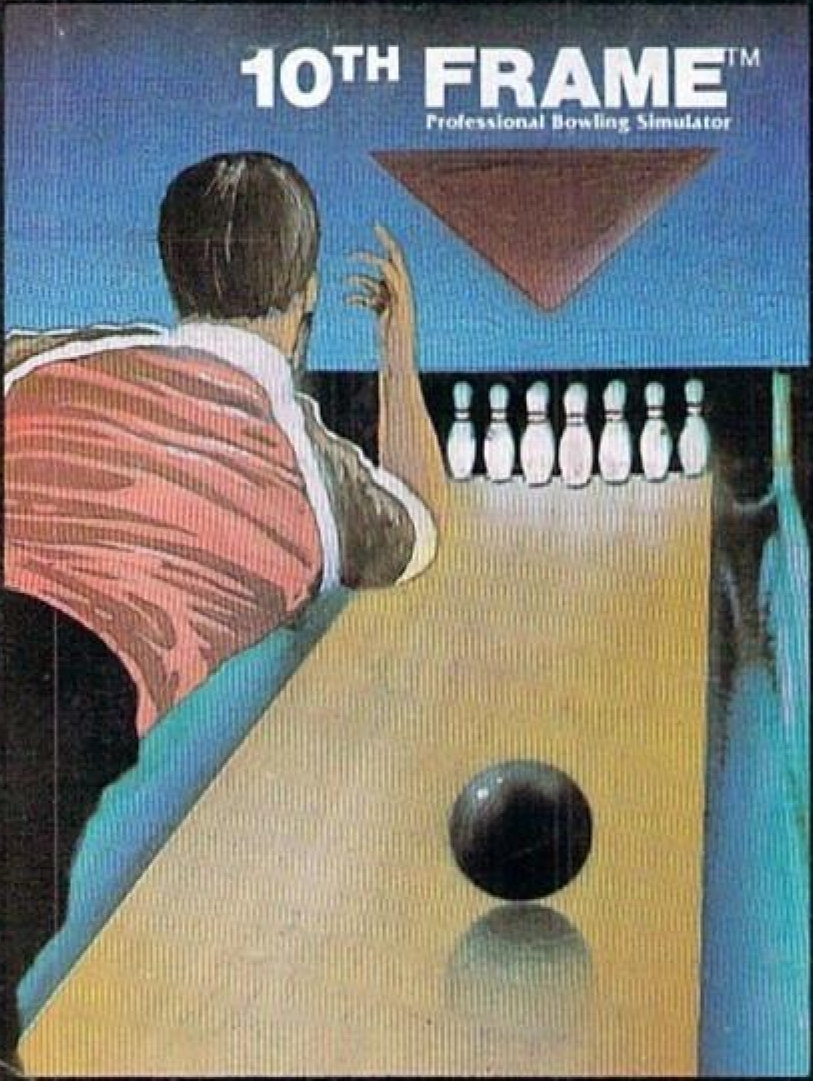
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